SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 1798.—Vol. XL. LONDON, SATURDAY, FEBRUARY 5, 1870. {STAMPED .. SIXPENCE. UNSTAMPED. FIVEPENCE

Original Correspondence.

THE INSPECTION OF COLLIERIES.

Sir,—As the report of the meeting to which the enclosed correspondence refers appeared in the *Mining Journal* (Supplement of Jan. 22), will you be so good as to give similar publicity to the letters in reply? Joseph Dickinson, Inspector of Mines.

Pendleton, Manchester, Jan. 29.

[COPY.]

Pendleton, Manchester, Jan. 19.—Sir: I see by the *Manchester Guardian* of today a report of your speech at a meeting held at the Town Hall, Oldham, yesterday, on the subject of protection to miners, and the education of miners' children. There are some inaccuracies in it with regard to dates, and such like, but these are only such as might be made by anyone not thoroughly conversant with the subject. What I am concerned about is your statement as to the appointment of sub-Inspectors, "who would visit the pits from time to time without notice, and without expecting to be driven there in the carriage of any person." This cannot, I should suppose, mean that the present Inspectors are not to be driven either in their own or a hired carriage or cab when they find it requisite; and I am afraid it will be taken as an insinuation that the riding is now done in the carriages of the colliery owners, and that the Inspectors do not act impartially. I shall be glad, therefore, as the statement has been made in my district, if you will inform me whether it is intended to apply to me, and, if so, whether you have any ground for making such a statement.

Joseph Dickinson, Inspector of Mines.

J. T. Hibbert, Esq., M.P., Oldham.

Urmston Grange, Stretford, Manchester, Jan. 20.—My Dear Sir: In reply to your letter of yesterday, referring to my speech at Oldham on Tuesday night, in which I recommended the appointment of sub-Inspectors of collieries, "who should visit the pits from time to time without notice, and without expecting to be driven there in the carriage of anyone," I do not for a moment hesitate to say that the words were not intended to apply to you or to your district. They were used by me in a general sense, and were meant to show more strongly the character of the inspection which I recommended—viz., that is should be frequent, unsolicited, and without notice. Having every reason to believe that the inspection in this district has been carried out impartially, I should be sorry if the words which I used should be supposed to reflect in any manner upon it. John T. Hibbert.

P.S.—The errors to which you refer are principally those of the reporter.

Joseph Dickinson, Esq., H.M. Inspector of Mines.

Pendleton, Manchester, Jan. 21.—Dear Sir: Your letter of the 20th inst. is satisfactory to me; but as it is desirable there should be no misunderstanding amongst the coal miners on the subject, I hope you have no objection to your explanation being made public. Joseph Dickinson, Inspector of Mines.

John T. Hibbert, Esq., M.P., Oldham.

Urmston Grange, Stretford, Manchester, Jan. 22.—My Dear Sir: You are quite at liberty to make my explanation public. In haste. J. T. Hibbert.

Joseph Dickinson, Esq., H.M. Inspector of Mines.

BOILER EXPLOSIONS.

Sir,—Observant newspaper readers can scarcely fail to have been struck with the large number of explosions which have lately taken place in various parts of the country. These explosions have not only resulted in serious loss of life, and a great destruction of property, but seem to throw a slur upon our engineers and manufacturers, which it is most desirable should be removed. For some reason or other, boiler explosions are generally classed in the category of "accidents," and the public are led to regard them as fatalities almost impossible of prevention, and to look upon them almost as a natural concomitant upon the use of steam power. In the great majority of instances, however, these explosions are no "accidents" at all, the facts proving that they arise from easily preventable causes. Of course, boiler explosions are the result of various circumstances, but principally may be traced either to malconstruction, inefficiency of strength, want of water, or that cheese-paring penny wise and pound foolish policy which sometimes rules supreme in the fitting up of new or the repair of old boilers. In either case, the blame is generally laid at the door of the engineer or manufacturer, and thus a wrong impression is conveyed to the minds of the public, most detrimental to the interests of a most important branch of trade; whereas a little investigation would enable those who take an interest in such matters to "put the saddle on the right horse," and exonerate from fault those whose interest, above all things else, is to prevent the recurrence of these dreadful explosions.

Scientific and mechanical knowledge has lately made considerable progress, and in the manufacture of but few articles has this knowledge been brought to bear with greater advantage than in the fitting and erection of boilers; in fact, there are now so many scientific self-acting appliances to denote danger—so many steam-whistles, blow-cocks, safety-valves, water-gauges, &c.—that the wonder almost is that boiler explosions occur at all—that they have not long since been numbered with the "things of the past." And yet it is lamentable to find that during the past year there occurred no less than 46 boiler explosions, killing no less than 86 persons, and seriously injuring about 100 more. Upon an average, therefore, a boiler explosion occurred almost every week throughout the whole of last year. Probably during the first month of the present year more than a proportion of explosions have occurred. This is a state of things which must be deplored by all large manufacturers and users of steam-power, and should impress upon all the importance of adopting every means which science and skill have suggested for the prevention of these calamities.

The subject now prominently alluded to is one of deep importance to the mining and manufacturing world generally, and one to which all should give their earnest attention. The loss of life which annually results from these explosions is a very serious thing, and the destruction of property great. In the majority of instances there has been a too great disregard of the scientific appliances, or a tinkering by incompetent persons in the necessary repairs. How self-evident is this last observation made by reading the evidence given last week at the inquest held respecting the explosion in the brickyard at Briton Ferry, South Wales, and which called forth justly-merited condemnation from Mr. Wales, the Government Inspector of Mines. Even regarded in a mere pecuniary point of view it is to the interest of all to adopt all modern scientific discoveries for the prevention of such explosions. Probably there is no fatal occurrence more easily preventable than these explosions of boilers. A strong, properly made and properly fitted up boiler, with all modern danger appliances, regularly cleansed and periodically inspected, is, comparatively speaking, free from even the risk of explosion, and is far more economical in its working. If our engineers and our working engineers would, as a rule, insist upon the most approved appliances being affixed to all boilers, would see that they were properly erected, and if the proprietors themselves would consult their own interests in the purchase of boilers so fitted, then there would be an immunity from these dread explosions. If, on the other hand, small manufacturers and users of steam-power will pursue the same false economy as they have hitherto done, employ incompetent men to tinker and patch old worn-out boilers, which should long since have been disused, then we shall continue to hear of these explosions; but, in the name of all that is fair and honest, let the "saddle be put upon the right horse," and the blame removed from the door of the manufacturer and engineer to that of the person who discards all modern appliances of safety, and disregards his own interests. Index.

London, Feb. 2.

MINING IN COLORADO.

Sir,—In looking over a copy of your valuable Journal of a recent date, I find that Colorado is at last beginning to attract attention among capitalists. I am surprised that this region, so rich in gold and silver, as well as other metals, has escaped so long the notice of those seeking investments in valuable mines. During the several months of my residence here I have made it my business to examine as thoroughly as possible the many different mines in Gilpin and Clear Creek counties, and gather such information as could be obtained in regard to their extent and value. As a result of this investigation, permit me to say that it is my decided opinion that for extent and richness the veins of Colorado cannot be excelled; they are broad, well defined, and generally easily worked. Hundreds of them are being worked by individual enterprise, mostly without capital, and in a very superficial and unpractical manner, and yet fair profits are realised. Were these mines in the hands of English companies, who would work them in a practical and miner-like manner, using more perfect machinery for the reduction of the ores, I am sure very much larger dividends would be realised from them than from such investments generally. Here money is lent readily at 2 per cent. per month; with our English capitalists it is worth from 3 to 4 per per cent. per annum. How much better investment in these mines would pay than those ordinarily made.

Railroad facilities for the transportation of freight to and from the country are enjoyed here now, and new life is springing up throughout the entire country. Hundreds are visiting the mines weekly, for the purpose of making examinations, with a view to investment. One of the best mines I have found, and one with the greatest promise for successful working in the future, is the California Mine. It is owned and worked by a single individual, and has yielded from the labour of 20 men, in the past year, over 40,000*l.*, at an expense of from 10,000*l.* to 12,000*l.*

It is impossible to mention all the lodes possessing great merit now, but in my future correspondence, should it please you to grant me space in your valuable Journal, I will treat of them more at length.

Central City, Colorado (U.S.A.), Jan. 15. Jesse Archibald.

GOLD MINING IN GRASS VALLEY, CALIFORNIA.

Sir,—I was delighted to learn of the success Mr. Batters met with on his return from this country, and I may venture to say without any fear of contradiction that Grass Valley is the richest mining spot in the world. Some short time since I had the pleasure to inspect the far-famed Eureka Mine. This is a wonderful property. I estimated in my report that the company had in reserve 64,800 tons of available rock without sinking a foot under the 500 foot level. This number of tons, at $20 per ton (which is below the average price), will yield $1,296,000 worth of gold. Even this valuable mine had its reverses in early days, and operations were suspended for want of capital. The Idaho at one time could be bought for almost a song, is now paying large dividends, and valued at hundreds of thousands of dollars. The Union Hill Mine, now the property of the Pacific Mining Company, was some time since stopped by means of poverty, when ultimately a rather promiscuous company was formed (many of them went to work in the mine), operations commenced, and prospects began to brighten, and so continued, when last month (December) the snug little sum of $17,000 was cleaned up, and the mine improving. The stopes and ends throughout the mine are looking healthy, particularly so in going east; they have some good reserves, and the future working of this excellent mine can easily be calculated upon by the simple Rule of Three. If a 20-stamp mill will produce $17,000 a month, what will a 30-stamp mill produce?

Here I beg to congratulate Mr. George Batters on his judicious purchase, and also the company connected with him. But the progress of mining need not be stayed because the Eureka, the Idaho, and the Union Hill Mines are rich. No doubt but what there are many who feel themselves somewhat disappointed by not having an interest in the Pacific Mining Company. To such I would say, Ye gentlemen of capital you need not despair, but follow the example of Mr. Batters—Come and see for yourselves. We have many such mines as the above, nothing but capital wanted to develope them, such as Scadden Flat, Rocky Bar, and Gold Hill; consolidate those mines, work them extensively, and you will have a Eureka. Next follows the Ione and the Union Jack; unite those mines, work them judiciously, and you will have an Idaho. In rotation I would call attention to the Greenhorn and the Potosi Mines, purchase and develope them, and you will have a Union Hill; besides there are many of smaller magnitude well worthy the attention of capitalists, and should be sought after in the least possible time. The question may arise, How is it that in former days many of the reported rich mines in Grass Valley made such disastrious failures? The answer is obvious. Without saying a word about the competency of management, we must remember that in those days, when the mines alluded to were proverbial for the yield of rich specimens, every available cellar and secret place were converted into a miniature quartz mill, worked by the "pestle and mortar" process, and the amount of gold thus clandestinely extracted must have been enormous.

Grass Valley, Jan. 10. Thos. Faull.

MINING IN IRELAND.

Sir,—About two miles west of Crookhaven is the Brow Head Copper Mine, which for the want of capital to carry on the works has been abandoned. The geological position of this property is clay-slate, traversed by several masterly and well-defined lodes, or metallic courses, possessing indications that must carry conviction to the most sceptical of its genuine mineral worth. Few mines in the kingdom produced so much ore of high percentage near the surface; in fact, it presents to the eye of the experienced miner evidence of immense richness, and it is to be regretted so valuable a property should remain undeveloped. Situate on the south shore of the commodious harbour of Crookhaven, the Crookhaven Copper Mine, which had been worked in a practical manner for some time, has also been discontinued, through the mine improved in depth as rapidly as could reasonably be expected; and had the adventurers had a little patience, I have no hesitation in saying they would be amply rewarded. The attention of enterprising parties is now directed to the Ballydehob mining district, which locality is peculiarly adapted for mining purposes, and its ore-producing capacity beyond question. At the Cappagh Copper Mine, now about to be re-worked, under circumstances the most favourable for the future of this most valuable mine, which has been wonderfully productive for the depth reached, the ore, too, is of a superior quality, and no doubt can be entertained as to the success of the adventurers, and I only hope a like spirit of enterprise will be extended to the mines of the neighbouring districts, where untold riches await the coming of the capitalist. I believe ere long the county of Cork will become of vast commercial importance: skill and capital are the only requirements needed to place it in a position little short of the brightest days of Cornwall.—*Bath, Feb.* 2. North Wester.

MINING IN CORNWALL—PROMISING PROSPECTS.

Sir,—Much has been said of late about Cornish miners. Now, I believe I am right when I state that nothing has paid better in past times to the investor than Cornish mining—certainly we have experienced two or three years of depression in the metal trade, but we have a turn now for the better, and I hope for the benefit of all that our mining speculators will take advantage of it. Many rich mines are yet to be found in Cornwall, but there are many parties who will tell you, if you should purpose working a piece of mining ground, with indications of the best description, "There is nothing there—the district is condemned, no dividend mines near at hand, I shall not venture there;" but this is to me a very wrong idea—there are many rich mines yet to be found. Having had nearly 30 years' experience throughout the county of Cornwall, I am enabled to speak with some degree of confidence that there are many tin lodes which, with present price of tin, would pay well to open at once—nothing required but outlay for machinery. Lead mines have kept more regular, and continue to pay good dividends. I may mention a lead mine between Bodmin and Liskeard (East Jane) that was abandoned about three years ago, probably for want of funds to erect proper machinery. I believe they sold about 7000*l.* worth of lead from one lode, and the depth of the mine is only 48 fms.; and I am informed that the lode in the bottom level never looked more promising for a large deposit of lead than when the mine was abandoned. The lode was large, producing a mass of gossan, with lumps of lead; so that, if we speak from the indications, it is evidently the top of a large mass of ore. It may be well for me to state, too, that this mine was worked near the south boundary, and that the lead is fast dipping south into the valley; and it is my opinion, as well as of many other practical mining men, that the main deposit will be found in the valley. Wheal Scilly adjoins to the south; this mine was worked some years ago, but they did nothing more than we might call shoding on the backs of the lodes, the deepest part of the mine being only 15 fms. below surface. At this mine, as at the other, the machinery was inadequate for deeper working, and the mine was abandoned for want of funds. It is the opinion of all who have examined the mine that if powerful machinery were erected, and the mine sunk another 40 fms., the lode would be found good and lasting. There are several lodes traversing the sett, most of which yield good stones of lead and gossan on the backs. It is my opinion the time will come when we shall see a regular group of mines in this valley. It only wants a little pluck and spirit, with a small outlay, to find one good mine, when you will soon find parties flocking around in search of others. There is every facility to work a mine here: the carriage of materials is easy, being near the railway, and a never-failing stream of water—the River Fowey passing through the sett,—sufficient to pump, draw, crush, dress, &c.; this is of great value. A Cornish Miner.

Pesqueira, Jan. 31.

MINING IN CORNWALL—THE MARAZION DISTRICT.

Sir,—I may begin this epistle with—

> "Breathes there a man, with soul so dead,
> Who never to himself hath said
> This is my own, my native land!
> Whose heart had ne'er within him burned
> As home his footsteps he hath turned
> From wandering on a foreign strand!"

Now, although I have not been wandering on a very foreign strand, yet there are many years glided by since I last visited the land that gave me birth, until I was induced to do so last month, to see many old faces whom I well remembered (but many have passed away), and as well to see what was really the state of things around the Marazion district. I found matters bad enough, but then they might have been much worse; and as it may be interesting to some of your readers to know the exact state of affairs in that part, I will give it to you as it comes under my notice.

On my arrival at the Marazion Station I enquired my way first to Marazion, and then on to Goldsithney. About midway between these two places I found a new mine being opened up, and, like all persons wishing well to their native home, was not content with a casual passing by, but I remained on the spot and examined the stuff carefully. I also took the liberty of asking some of the miners on the ground to get the captain (a most intelligent and industrious man, and who was then underground) to have the kindness to give me an interview of a few minutes, and this request was complied with—hands were grasped that had not before shaken for fourteen years. I found they were working at a depth of 15 fms. from surface, on a lode varying from 4 to 6 ft. wide; and as it would be superfluous to go into what I consider and which some men might say would be probable, I will say at once that there is no matter for consideration or probability, for the lode has really entered into a course of yellow and black copper ore; and a finer or better young mine I do not recollect seeing for very many years.

On arriving at Goldsithney I found my friend, Mr. Absalom Bennett, had been instrumental as the moving cause, and that he and the Messrs. Wm. and Thos. Gundry were (I believe I am correct) the sole proprietors of the property. Nothing could have given me greater pleasure than to know this, for from the time of my father having set his foot in this part the ancestors of these gentlemen had been the means of employing him as their manager, and they opened out the great and good mines around, which caused so much good to the community at large, and were the means of raising and producing millions of pounds worth of tin and copper. During my stay the Messrs. Gundry paid a visit to the mine, started a new engine-shaft, and in a few months a steam-engine will be erected; by that time we may expect to see a large number of hands employed of every kind, and good dividends going into the pockets of the shareholders. The mine is on a maiden piece of ground, and stands midway between the Old Wheal Neptune and the Great Wheal Fortune Mines, both of which were worked by the Messrs. Gundry of other days.

I found that Great Prosper was kept on entirely by the tributers—a most intelligent and hard working lot of men, and for many years these men have been more than self-supporting. When mines were abandoned they would go and find pieces of ground, paying a royalty of one-eighth or one-tenth, and work their own way. Many are doing this at the present moment.

To think that mining in Cornwall is going to nothing seems to me the most

absurd of all things that a man can possibly imagine. Mining is inborn with them, and if every mine in Cornwall should be suspended you would, I believe, see the miners raise amongst themselves eventually capital to try the best of the old and much of the virgin ground, and of the latter in many districts there is any quantity of it. There is, no doubt, consideration wanted on the part of agents as well as shareholders as to the best method for carrying on such trials.

Well, Sir, I was determined if I could select a piece of ground worthy of trial near the spot that I would use my best endeavours to procure a company to work it. The ground I soon found, and here is the report on it, which (although it may be laughed at by some to see a portable engine at work in Cornwall) was good enough to secure a very influential company to give it a trial :—

NORTH WHEAL NEPTUNE.

During my stay at Goldsithney, in going over a piece of ground I was very forcibly reminded of the appearance of the gossan of the Old Wheal Neptune Mine, and on examining it I found that, although it had been worked over the 15 fm. level for tin ore, it had began to make grey copper ore. The parties that formerly worked this ground worked deeper to the west than any other part, and obtained from it a considerable quantity of yellow copper ore, and this they considered to be the best place for a trial. I could not at first account for the change in the character of the lode, but from information obtained by the dial I soon found out there was a cross lode intervening, called locally the lead lode ; I suppose from its producing in places some of that metal. To the east of this lead lode, from its character and position, for some 300 fathoms there must be a great course of rich grey copper ore, and as the lode has already began to show it a few fathoms only in sinking is safe to reach it. In order to do so I would not advise the erection of powerful steam-engines, but would put up a portable engine for pumping and drawing the stuff ; this should be powerful enough to reach a depth of 40 fathoms, and would cost but little. Now, the mines in this part all make good, or not at all, at that depth, so that the trial would be cheap, and we should, if and when required, be in a better position for knowing the correct spot for erecting such machinery, and also the power required. The Old Wheal Neptune, under my father's management, made immense profits when the price of copper was not higher than at present, and a great deal of it was taken away at a tribute of from 8d. to 1s. in 1l.

I have compared the stones from the same depth from Wheal Neptune, North Wheal Neptune, Wheal Buller, and Wheal Basset, all grey ore producing mines, and no one can select one from the other. But more than this, when our engine is at work I think we shall start with a profit, for I find from my friend Mr. Laity, the proprietor of the mine and ground, that over the place we should start to work tin ore was raised above the water level (15 fms.) on tribute in 1868—May 30, 21l. 9s. 7d. ; June 24, 65l. 7s. 6d. ; July 11, 77l. 10s. 9d. ; July 30, 63l. ; Aug. 21, 38l. ; Sept. 11, 17l. 13s. 8d. ; Sept. 19, 12l. 8s. 10d. ; Dec. 21, 1869, 4l. 10s. 6d. ; and in Jan. 1, 1870, 15l. I have before spoken of its character and position. Its position is about three-fourths of a mile to the north of Old Wheal Neptune, which made great courses of ore for three-fourths of a mile in length. In order to get great courses of ore, you may go to each extremity of this ore ground, and strike a line direct north or south, as the case may be, and if your lode bears the proper marks or signs for productiveness, you will be as safe to find it on one as on the other, as similar causes produce similar results, which has been my experience throughout my life of mining. I have promised 1000l. for the mine and materials ; another 1000l. I think would do all we require, and be sufficient to place it as one of the best dividend-paying mines in Cornwall.

If these mines should prove to be prosperous, their success would undoubtedly lead to the re-working of many of the old mines that were once very rich in the neighbourhood ; and the lords should look well to any that are likely to become abandoned, that the shafts and levels should be made clear and right, and as they ought to be left, or they may suffer greatly by their neglect.

Goginan, Feb. 2. ABSALOM FRANCIS.

MINING IN CARDIGANSHIRE.

SIR,—The *Mining Journal* of last week brought before the mining world the names of some new started mines, which, by-the-bye, are continually rising in this county, as well as those of the old, that are still stars in our land—I mean, in the first instance, the West Cwmystwith, which is being worked at the present time by Capt. R. Williams and party, of Goginan village. This mine has been allowed to remain idle for years. Cross-cuts had been driven in the side of the hill to intersect the lodes, and levels extended east and west. They then appear to have dropped it. The present party had often been told by agents in the adjoining mines not to place their money in such a concern, as they and their employers had spent and lost a good sum in the same mine. However, our friend, Capt. Williams, did go on ; and, contrary to the opinion of the next door neighbour, he has gone on successful. The present appearance of the mine speaks for itself ; long may it continue good and prosperous. There are other new mines being brought out, but since I am not authorised to make mention of them for the present, I can but add the one or two of such as I have the pleasure of knowing well—the West Bronfloyd, Esgair Llee, Cam-dwr, &c.

I would now briefly introduce a few of the old mines as they are at present. The Journal mentions the names of some mining meetings having taken place in London since the New Year has dawned upon us. First, there is the Bwich Consols meeting ; the report of the agent, Capt. Northey (who himself was present), speaks for itself. I have only to mention names to remind the world that this mine (also once being abandoned, like all the rest of the class) is, and will flourish to gladden the hearts of the poor miner and his family. Should this not be sufficient to induce others of the great cities of England to come forth with their capital and try for themselves I know not what will ; but I will tell you (reader of this Journal) there are at the present moment thousands of acres of mining land yet unexplored in this county, and as good as those ever brought to light. Fear not, then, that all the best are gone, but come forth, lay your hand to the mining branch of science, and your fortunes are as sure as those made years ago, or even to-day.

Nantcos Consols held their meeting on Jan 11. The report of Mr. T. P. Thomas, and the opinions of himself and Capt. Barbery, were so highly satisfactory as to induce the shareholders to express such high encomiums and cheerful smiles, and to hear the promises of the future destiny of the mine, which (time alone will reveal) makes one ask the question, Was this also an old mine? I must say, Yes, it was, and abandoned long ago by the present Mr. T. P. Thomas and others of great repute in the mining world. I hope that as Mr. Thomas has promised to make the mine do so much, that he may, as I believe he will, be agreeably deceived, and that all his promises may be doubled. It is well to notice Capt. Barbery's remarks : when speaking of the nature of the lodes, he says they have such promising appearances, mixed with the most beautiful gossan, spar, blende, white and blue lead, &c., and similar to that of Bronfloyd (this being still one of the richest mines in the Principality). Long may it last, and soon may we have the pleasure of hearing of the western mine sharing the riches of the hill in which both mines are connected.

I have nothing particularly new to speak of concerning the Esgair Llee West. The mine still looks very well—neither of the Castle Mine. Here they have a good patch of blende for sale, oroken from a stope underground as big as a church, and full of this mineral, but expect in depth to find lead equally as productive. I sincerely hope they may, to repay them for the past and present. The Ponterwyd range of mines are still alive, and that is all ; but as we advance further west, passing poor idle Clara Mine, we meet the Llywernog and Powell United Mines, working by water and steam, and striving, like their neighbours, to do their best. They are both looking very well underground and at surface. Although this frost will very much impede the dressing, yet we must expect it, and grumble not. Bwadrain Mine is still holding up its head in the lead market, and scarcely any alteration since my last visit in the county. Cefn Brwyno is much improved. I am glad to hear of any mine rising, but especially in this case, where parties left it neglected through poverty. It is once again showing forth the light of its countenance, proving that mines should not be too soon condemned. The piece of ground lying between this mine and Powell United has never been touched, so that by the two mines continuing their levels east of Cefn Brwyno, and the west in Powell, the heart of the virgin ground shall be divided between the houses of Pryse and Powell—namely, Gogerddan and Nanteos. Great praise is due to Capt. James Paull for the manner in which he has forced on the levels in Cefn Brwyno to the present state. Many other mines in the neighbourhood are being worked vigorously, and I may safely say that, taking the county as a whole, mining never looked better than at the present moment, and we may all truly and faithfully hope that it may not do less, but continue to improve until we shall all have made ourselves and friends sufficiently wealthy.—*Aberystwith, Jan. 20.* S. TREVETHAN, Jun.

P.S.—I would remark that lands belonging to the Crown in the different parts of this county might be more flourishing if the agents to the Crown would condescend to be a little more liberal in their dues, even with the terms of our Welsh lords and landholders—reduce their royalty to (say) 1-14th or 1-16th. They would find that thousands of acres would be applied for, and mines, miners' houses, corn fields, and gardens would then spring up and flourish, where now scarcely a face can be seen ; and at the same time get the mines in general of this county brought out by way of plans and sections, as may now be seen of some of the Pwllheli Mines, in the lands of our worthy land and mineral surveyor, Mr. Topham Humphreys, of this town.

RHOSESMOR MINE, FLINTSHIRE.

SIR,—Would your correspondent, who wrote the "Mining Notes from North Wales," which appeared in the Journal of Jan. 22, be courteous enough to reply to a few questions which I am desirous to put to him relative to this property? It is stated, "Instead of pumping the water they are going to drive an adit level, in connection with the Deep Level Mine Company." What is the distance from the present end of Deep Level to the Rhosesmor engine-shaft? height of backs, when there? time to drive the level? and cost? whether on the lode or cross-cut? Instead of "up to a year ago paid dividends," has it not taken nearly four years to spend the money got previously? Did the company lose 25,000l. in 1867 and 1868?

If your correspondent will kindly reply to my enquiries, it may be the medium of preventing an extra loss of 25,000l. only they would have this advantage, that it would take the company about 20 years instead of two to spend the money.

Feb. 2. JOHN TREVETHAN.

YORKE PENINSULA MINING COMPANY.

SIR,—In a letter which appeared in the Journal a fortnight since, respecting this mine, it was stated that "in the Burra Burra the latest discovery of ore, very near the surface, is but a few yards from the line which constitutes the imaginary boundary between that mine and the Bon Accord, belonging to the Yorke Peninsula Company ; and the ore appears to run directly towards the Bon Accord property." As it is very desirable that the authenticity of this statement should be established, I send you an extract from the latest report, and no one knowing the high character of the direction in England, as well as that of the gentlemen forming the committee of inspection in Australia (who are of the first men in the colony), will be disposed for a moment to question its trustworthiness :—"The township upon the Bon Accord estate will not be an obstacle to future mining operations on the property, all minerals in the land will be reserved ; and, as regards this important matter, the Burra Burra Company has lately made a discovery of ore near the surface, in a new locality on their property, which appears to run directly towards the Bon Accord ; and they are also raising ore again at 'Beck's workings,' at the distance of a very few yards from the imaginary line which constitutes the boundary between the two properties. Your directors are further assured, on excellent authority, that the operations which are being carried on in the Burra property will be calculated in a great degree to throw light upon the question of where to search for the continuation of their ore in the Bon Accord property."

Feb. 2. J. RESPONDENS.

[ADVERTISEMENT.]

VIRTUOUS LADY, AND OTHER PROMISING MINES.

SIR,—We are in trouble, and it is no more than I anticipated. Months ago I wanted to lay out effectively two or three of the several dressing-floors made by those who worked the mine in former days, but was over-ruled by the advice not be in too great a hurry ; the consequence is that in the old workings we are finding so much ore and orey ground that our present surface appointments will not keep pace with our get of ore ; but still this little matter will soon be put straight, as we may now begin to look for better weather and longer days, and in order that my prediction of 20,000l. profits shall not be put out of the way through lack of surface arrangements, I will take particular notice that this department has every attention and care at once paid to it.

Now, just to show you what this mine is, I will mention that near the Garden shaft, six weeks since, two men and two boys took a pitch at two-thirds in 1l. ; these tributers have knocked down a tremendous pile. Our agents put it down at 200 tons of orey stuff ; however, say 150 tons ; every bit must be raised to surface and dressed, and it is calculated it will yield 20 to 30 tons of ore, worth 6l. to 8l. per ton ; it is good cobbing work, and the pitch now looks better than ever, and besides masses of ore ground still standing they have a branch of solid ore 8 in. thick. Metherell's end, a week or two ago as poor as a rat, is now in the driving turning out good work for low price ore, and only one hole put in the back has gone into solid copper. Men doing exceedingly well at 6s. 8d. in 1l. in Hawke's stope. The main place for mineral, Buckland bottoms, in the bottom of the mine, is something remarkable ; it is one run of orey ground hundreds of feet wide. The men who could not make wages, according to the statement of Mr. Neill, have earned 50l. in one month by this take. We are thinking of setting this part upon tutwork by solid fathoms to knock down the whole, so that we shall have the good with the bad, and the poorest of the stuff can be placed on one side, and only the ore and saving work raised to surface. I have conquered already, no credit to me, as I never expected it in the old workings, but without going any deeper we have a property that is already not so very far from the top of the tree in English copper mines. No ore, indeed! We shall be able to put on a score of men knocking down ore and orey stuff that will keep the hauling machine in perpetual motion, and make the surface one busy scene. I have not time to enumerate upon all the points, but every pitch is looking well, and two fresh pieces of ground were set yesterday. "Criper's bunch," named after one of the shareholders, is turning out good stones of ore, and will most likely be shortly set upon tribute ; this part of the mine has derived its name through Mr. Criper coming to grief when descending a rather awkward and steep piece of ground ; in his warmth he suggested that it might be trimmed, and made a little less rude and impassable ; his suggestion was carried into effect, and Mr. Criper's fall will be the cause of the rise of copper.

Give me space for one word respecting my pet spot—the cross-cut south. Depend upon it we are going into an immense course of ore. We have tapped water, the first drop seen in the end, and altogether the indications denote that we are nearing a great change, whatever it may be. In another week the shaftmen will have cleared up the bottom of the shaft, about 2 fms, of slime, when we shall be able to get back to the Clan shaft. According to rumour, there is a fine lode of peach and ore standing there. I am not a bit alarmed about making 20,000l. profits by the end of this year ; in fact, the old workings alone will contribute a good sum towards it.

WEST MARIA AND FORTESCUE.—I have 300 of these shares, and only regret it is not 3000. I visited the mine last week, and have further had it inspected by a person on whose judgment I can rely. I should like an offer of 1000 of these shares, 500 for cash, and 500 for delivery the end of March. It appears to me the holders will not sell. I have offered to buy at quotations, but could not get supplied, save a paltry 20 or 30.

BRENTOR MINE.—The numerous applications I am receiving for prospectuses ought to stimulate me to sit down and write one, but really my time is so occupied that I have not been able to give attention to the Articles of Association, and the one-hundred-and-one little matters attending the registration and forming of a limited company. I, however, am not neglecting the mine, and in about three weeks the machinery will be in motion, the shaft unwatered, and men in the bottom at work. This concern is, in my mind, so sure of success that I feel confident the 1l. shares will be up to 2l. a few weeks after the sinking of the shaft is resumed.

VAN MINE.—One word about this extraordinarily rich property. I should have been 2000l. better off had I taken my own advice, a week or two since, instead of listening to that of others. THOMAS J. BARNARD.

6, Abbey Mead, Tavistock, Feb. 3.

VIRTUOUS LADY MINE.

SIR,—In last week's Journal there was a short letter from Mr. J. L. Pearce, to which I wish to make the following reply :—

First,—I ran down to Tavistock before Christmas, with the intention of making the acquaintance at one and the same time of the mine itself and the secretary, Mr. Barnard, hitherto known to me only by correspondence and the advertisements and letters in the *Mining Journal*. On my arrival at Tavistock, finding that the secretary was from home, I determined not to disclose the fact of my being a shareholder, deeming that if I visited the mine as a complete stranger I should get a more "impartial" view of the real condition of things. Was I right, or not? For myself, at any rate, I drew a favourable augury from the fact that as a perfect stranger to the directors resident at Tavistock I was not only without the slightest hesitation granted an order by them for admission to view the property, but was most courteously shown through it, both above and underground, for several hours—as long, in fact, as I chose to remain. Although highly pleased with what I had seen, I did not throw off my *incognito*, determining to do that at my next visit, as Mr. Barnard (the only gentleman connected with the mine with whom I had had any correspondence) was not present. Returning in the evening to my hotel, I met Mr. Pearce, whose conversation on the occasion was certainly of a nature very prejudicial to the mine and its promoters. Though not agreeing with him as to the value of the property, I thought it would not be a bad plan—for the reasons stated in a former letter to the Journal—to adopt his suggestion of procuring a man of experience to inspect the mine formally for me. He undertook to recommend me an agent of twenty years' experience, and I left a commission (by note) to Captain Neill for that purpose. This conduct was, of course, very kind on the part of Mr. Pearce ; but I was not without a suspicion at the time—a suspicion since expanded into conviction—that his activity on the occasion sprung, not so much from a regard for me—a perfect stranger to him self—as from hostility to some of the directors.

Secondly,—As to the matter of fees. I left Tavistock on Dec. 24, in order to be at home on Christmas Day. Capt. Neill's report did not arrive for several days ; meanwhile, business had again called me away. My absence was prolonged to a greater extent than anticipated—in fact, to several weeks. I wrote to acquaint Capt. Neill of the fact, adding that immediately on my return I would communicate with him. I was again at Tavistock on the 21st inst. ; I left on the 22d, arriving home late on Saturday night. The Sunday intervened, and on Monday, the 24th, I sent Capt. Neill his fee. Was that sufficient? At the very time Mr. Pearce's letter on the subject made its appearance I was holding Capt. Neill's receipt. Truly the *animus* in the affair is not far to seek.

One remark more, and I have done with the subject. Mr. Pearce claims that the fact of his having guaranteed the payment of the fee (a circumstance unknown to me) gave him the right to use my report. On the same principle, if I bought a pair of boots, Mr. Pearce becoming my security, would he (without taking the trouble to ascertain whether I was going to pay for them or not), wanting a pair of boots, proceed at once to induct himself into mine? But enough. You thought fit, Mr. Editor, to print Mr. Pearce's letter ; you have now inserted my reply ; and the public will cry—"Enough of this : we want to know about the mine, and not about individuals." The public is right, and I would honestly advise any one seeking a good investment to follow my example, and go and see the mine. The directors are perfectly sincere in their invitation to the public. They are honestly convinced that no mining property exists within the two counties presenting such splendid prospects for the future, supported by such accomplished facts in the present. Anyone with a few thousands, or a few hundreds, to invest might, at an expense of 2l. or 3l., satisfy himself with his own eyes, and with his own calculations, based on the patent facts, whether the property be what its advocates represent or not. Every courtesy will be shown towards any person really seeking an investment, and every facility accorded for viewing the mine. (I may mention, in passing, that third-class tickets from Waterloo Station to Tavistock are issued, per express train, at 19s. each—so that, whether on the score of cheapness or comfort, no one need be deterred from a few hours' journey). Whoever will take the trouble will be amply rewarded. IMPARTIAL.

VIRTUOUS LADY MINE.

SIR,—On reading the Journal of Saturday last I saw a letter from "Impartial," in which he speaks of my having reported Metherell's pitch to be abandonded. In my report of Dec. 24 I reported on "Metherell's end driving on what is called a lode, but the ground was hard and unproductive." Since that time the end has been abandoned, and Metherell's pitch, which "Impartial" alludes to, is quite another place. I hope the next time "Impartial" visits the mine he will learn the difference between Metherell's pitch and Metherell's end.

I also deny the statement of "Impartial," that I only saw one-tenth part of the mine on my visit. I saw every part of the mine then being worked, which I consider quite enough, unless I was wanted to open new ground for them.

Cross Way House, Albaston. THOMAS NEILL.

VIRTUOUS LADY MINE.

SIR,—The statements which have appeared from time to time from the secretary of this mine have conveyed the general impression that the discoveries in the pitches, and other explorations throughout the mine, have been of the most extraordinary character, and from the almost fabulous amount of dividends promised, any practical miner would be led to infer that great quantities of ores of different descriptions were being broken, and that large and immediate samplings would be the result. Taking the report of the agents of the mine, however, as a guide, this would not appear to be exactly the case ; and Capt. Neill, the only independent practical man who has been called in, and whose report appeared in the Journal of Jan. 15, says that the whole of the raisings—after months of working, and constant reports of wonderful discoveries—will not amount to 50 tons of ore, and that the tributers are not raising sufficient ore to earn wages at an average tribute of 12s. in 1l. With the mine quoted in the market at 50,000l., and reported discoveries of amazing magnitude constantly paraded before the public, you will, perhaps, consider it desirable to publish these facts for the information of your readers who happen to reside at a distance from this Devonshire El Dorado. A MINE ADVENTURER.

MINES, AND THEIR PRICES.

SIR,—There is no accounting for people's tastes, and a quiet man seldom gets fair play. This has never been better illustrated than in the case of two mines in two different counties. The one has not as yet sampled a ton of ore, neither is it in a position to sample 20 tons if called on to do so, and its prospects are too well known in the district for me to make any comments on it ; yet this mine has been written up until the public almost believe it an El Dorado. The other has never called up a single penny of capital, has spent in the past year more than 3000l. in new machinery, has paid 1800l. in dividends, does not owe a penny of cost, and its reserves are estimated at 18,000l. ; and yet if you ask a broker about it his reply is, "We don't know ; there is no information obtained except from the office." This would go to say if you wish to get a mine dealt in, no matter what its merits are, you must puff it. But I think not. Only let the public carefully consider the above figures, and the Holmbush and Kelly Bray Mines will be as well known on the market as any other.

Cheapside, Feb. 3. A LOVER OF LEGITIMATE MINING.

[For remainder of Original Correspondence, see this day's Journal.]

FOREIGN MINING AND METALLURGY.

The quotations of coal at the French mines have been maintained at former rates, but freights from Anzin and Lens have experienced a sensible reduction ; this fall is attributed to the slackening which has taken place during the last few weeks in affairs. It is expected, however, that freights will rise again, as at Paris transactions in coal begin to show rather more animation, since the fears occasioned by certain political events having disappeared the works have resumed their habitual activity. If we also take account of the hopes excited among industrials by a modification of the octroi duties imposed on coal, and the moderate stocks on hand, it is reasonable to anticipate a serious revival in affairs. Further, the present moderation of the freights from Anzin and Lens will permit the great works to purchase upon advantageous terms, and the boats finding it easier to obtain cargoes freights will assuredly advance. The iron trade has continued quiet in the Champagne group, in which the demand cannot be said to have revived at present. Quotations for almost all descriptions of iron are, however, extremely well supported, and the advance which has taken place in charcoal-made pig has given more firmness to the price of puddled iron made from that description of pig. Machine iron remains without change—in other words, its position continues good. Charcoal-made pig for refining has been the object of some affairs ; one transaction has been concluded at 4l. 9s. 6d. per ton in warehouse at Joinville. Employment has slackened in the foundries of the Champagne district, orders arriving in less abundance ; pipes, girders, &c., are still, however, in some demand. The Champagne Committee of Forgemasters should have held a meeting on the 25th ult., but the sitting was postponed. Rough pig has made 2l. 14s. 6d. to 2l. 16s. per ton in the Moselle ; one forgemaster is stated to have concluded a contract at 2l. 14s. 6d. per ton at the works. A company has been established for the purpose of building a great furnace at Audun-le-Tiche. We learn that a meeting of the forgemasters of the Meurthe, the Moselle, the Ardennes, and a part of the Meuse has been held on the invitation of the three principal establishments of the Moselle ; the object of this meeting was to propose the formation of a committee representing those groups for the defence of their common interests. The Fourchambault Forges Company has just obtained a contract for a certain number of grease boxes, to be delivered to the Orleans Company, but at lower terms than those at which similar boxes were supplied in 1868. The French Administration of Telegraphs has just let contracts for some pipes, with galvanised iron supports, bolts, &c., required for pneumatic despatch tubes. The contract for one of the lots (for cast-iron pipes) was awarded to a Belgian undertaking, the General Water Conduit Company, at Liége. Another contract for galvanised iron pipes was awarded to MM. Jouffreant, of Lyons, who have charged the Royal Eagle Tube Works, at Birmingham, with the manufacture of the pipes. The articles referred to in these contracts will be exempted from all octroi duties on entering Paris. Some of the principal French metallurgical firms have issued a "declaration," from which we make a few extracts. The declaration observes :—"Under the system in force prior to a decree of Jan. 10, 1870, the exportation of metallurgical products from France was developed on a considerable scale, and attained for 1869 a total of about 220,000 tons, in which products leaving the forges direct, such as rails, iron plates, &c., figure for about 150,000 tons, or more than one-sixth of the whole production. This exportation, especially as regards these products, will be annihilated, or gravely compromised, by the new decree, and a mass of products will fall upon the French market, which will not be able to absorb them. The decree of Jan. 10, 1870, although inspired by a desire to promote the welfare of French industry, will thus have consequences altogether contrary to the object proposed. The proprietors of the forges signing this declaration thus solicit an adjournment of the application of the new decree until a parliamentary enquiry has taken place, in which all explanations of fact and detail can be given in order to justify the observations now made. It is not at all a matter of urgency that the present decree should be modified, since the condition of metallurgy is, upon the whole, satisfactory." MM. de Wendel, MM. Schneider and Co., and other leading firms, have signed this declaration, and altogether the signatures represent an annual production of pig of 662,418 tons, and of iron of 454,828 tons. MM. de Wendel give their annual production of pig at 140,000 tons, and of iron at 100,000 tons. MM. Schneider return similar figures.

There is nothing very particular or novel to notice in the state of the Belgian iron trade. The rather prolonged absence of new orders for rails begins to excite some little uneasiness ; at the same time, the rolling mills are still well provided with contracts, so that work is still assured to them for some months in advance. Before existing contracts run out there is every probability that new ones will be entered into, as requirements exist on a considerable scale, which Belgium will certainly be called upon to satisfy, either in whole or in part. The exports of rails from Belgium in the first eleven months of last year amounted to 130,693 tons, against 67,386 tons in the corresponding period of 1868, and 76,967 tons in the corresponding period of 1867. The totals for the three years were made up as follows :—

Direction of export.	1869.		1868.		1867.
Russia ..... Tons	67,275	.....	44,590	.....	63,895
Sweden and Norway	730	.....	—	.....	—
Zollverein	7,214	.....	6,431	.....	27
Hanse Towns	—	.....	106	.....	147
Low Countries	2,812	.....	3,597	.....	3,413
England	2,316	.....	12	.....	205
France	2,075	.....	472	.....	539
Spain	36	.....	130	.....	103
Italy	12,169	.....	3,630	.....	8,583
Switzerland	30	.....	—	.....	—
Turkey	27,748	.....	700	.....	—
United States	6,773	.....	5,578	.....	—
Rio de la Plata	220	.....	—	.....	—
Other destinations	1,495	.....	2,339	.....	55
Total	130,693		67,385		76,967

The augmentation observable as regards the exports of plates is less decided than that of rails ; but it is, nevertheless, very satisfactory, since the exports for the first eleven months of 1869 were 19,274 tons, against 12,670 tons in the corresponding period of 1868, and 11,716 tons in the corresponding period of 1867. The exports of rolled iron from Belgium have also been progressively advancing of late, having risen from 49,590 tons in the first eleven months of 1867 to 65,068 tons in the first eleven months of 1868, and 74,838 tons in the first eleven months of 1869. The exports of coal from Belgium in the first eleven months of last year amounted to 3,285,721 tons, as compared with 3,403,503 tons in the corresponding period of 1868, and 3,288,570 tons in the corresponding period of 1867. The exports of coke from Belgium in the first eleven months of last year amounted to 598,817 tons, as compared with 491,330 tons in the corresponding period of 1868, and 479,830 tons in the corresponding period of 1867. The present state of the Belgian coal trade is tolerably satisfactory ; the demand for coal for domestic consumption has revived. Coke also continues in considerable demand.

FOREIGN MINES.

ST. JOHN DEL REY.—The directors have received, per the Estramadure, the following report, dated Morro Velho, Dec. 29 :—Morro Velho produce, second division of December, 12 days, 2771 oits. ; yield, 2·045 oits. per ton. Gaia produce for above period, 164 oits. ; yield, 0·520 oits. per ton. New shafts sunk during December—A, 3 fms. 3 ft. 6 in. ; B, 3 fms. 3 ft. 9 in. ; and the adit level driven, 6 fms. 1 ft. 9 in.

DON PEDRO.—Produce weighed to date, 8965 oits. ; estimate for December, 12,000 oits. Line in No. 6 (new lode), rising west, has given good breast work, and, on the whole, the general body of lode excavated has been better than in November. From the bottom of the mine little ore has been broken, owing to water. The canoa, in underlie lode, continues disordered by a fissure, but there are signs of an improvement beyond its influence. We are continuing sinking Vivian's shaft below footwall of curve ; auriferous samples are often times taken. A little box-work has been taken from the southern extremity of curve, and a large quantity of the reserves west of gully have been treated. Treloar's level has been suspended for a short time, owing to a scarcity of timber ; this will soon be rectified. Exploration at Alice's west has been continued. I hope in my next to report the horse-engine having gone to work.

ANGLO-BRAZILIAN.—Little alteration has been place in the appearance of the mine since my last. We are pushing on the works at Foster's section with great vigour, so as to open larger workings on the Fundao lode. Attendance has been better than expected, considering the Christmas holidays ; fewer went to their homes, and of those some have already returned, so that we are commencing the year 1870 under favourable auspices. By special efforts we have managed to tide over the holidays without any stoppage to the stamps from scarcity of stone.

GENERAL BRAZILIAN.—Dec. 31 : The operations are still confined to building, making, and repairing roads, but the weather and Christmas holidays have militated against us.

TAQUARIL.—T. S. Treloar, Dec. 30 : Operations Generally : The weather since my last has been favourable, and attendance of force, taking into consideration the holidays at this festive season of the year, satisfactory. The erection of wheel and other works connected with the pumping machinery are progressing apace. The former will, I hope, be finished in the course of another ten days. The mouths of the deep adit and Rouse's levels have been thoroughly secured with timber, and dressing operations resumed. In the latter the ground is wet, and extremely troublesome for handling. At the cutting for passage of flat-rods a large quantity of earth yet remains to be removed. The cross-cut to the old mine from the bottom of engine-shaft, contrary to expectation to date, has not intersected any of the old workings : we are unquestionably now very close, and may reach them at any moment. The ground in the end during the last fortnight has been very hard and difficult for quarrying.—P.S.

nce writing the foregoing we have, I am pleased to state, holed to old works; they are much crushed, and are very foul. A rise to surface for ventilan will immediately be commenced.

UNITED MEXICAN.—C. J. Furber, Dec. 24: Regarding our mines, report must be somewhat succinct, in consequence of the assassination of brother by banditti.—Mine of Jesus Maria y Jose: I have not been in La z for some days, yet I am sorry to inform you that the mine of Jesus Maria s not improved. We are throwing down a little more ore from the reserves, t the planes (deepest workings) are poor, and must be abandoned. They have l a fair trial, at a considerable expense, and it is now proved that they cannot worked to advantage. The accounts for the month of November show an cess of outlay of $5470, and even the raspa from Dolores, to come into the ember accounts, will yield less than usual.—Mine of Remedios: The report Remedios is better than last month, as we are throwing down a good deal of in the frente of San Cristobal and in the slope of San Eligio; a favourable ture also is that in the mouth of the mine which is coming down to communate with the workings we have cut the lode in ore, and as that ore is 30 varas ve San Cristobal it is reasonable to presume that all the solid ground between two is in ore. The profit to the company for the quarter ending Nov. 30, 9, is $4036.—New Concern Adit of San Cayetano: In the adit we advanced November 9¼ varas, and the total length on the 30th of that month was varas.—Mine of Buenas Ayres: In the shaft we had reached, on Dec. 18, metres in depth. The rock has been hard since Dec. 1, but shows signs of tting more favourable.—Mine of San Antonio de la Ovejera: The shaft in this ine has been, and still is, in very stiff rock; the depth on Dec. 18 was 0 metres. Nothing worthy of remark has occurred in the whole "New Conrn" during the month.

ROSSA GRANDE.—Dec. 31: Mina de Serra: I have little of conuence to advise since my last. The appearance of the lode in the stopes bew the 56 fm. level is more encouraging; its size, which averages about 2 ft., is ting very regular, and the auriferous quality of the stone, seemingly, is of same value as that of previous month. The features of the lode in the 60 fm. l continue very favourable, both as to size and appearance. The western plorations at Gongo Soco are progressing without noteworthy alteration.

FRONTINO AND BOLIVIA.—The directors have received their usual vices from the mines, accompanied by a remittance of 369 ozs. of gold dust, produce for the month of November last. This remittance is small, owing several temporary causes.

ANGLO-ARGENTINE.—Mr. Barnard, the company's superintendent c. 17), writes from San Juan:—"During the past week I have forwarded all stores, ex Agilis, to Gualilan."

EXCHEQUER (Gold and Silver).—Jan. 10: On Monday, after the ceipt of your telegram with instructions to commence work, possession was tained, and on Wednesday three men were clearing out the old tunnel, in ich there has been considerable caving, fitting up blacksmith's forge, laying ck for ore and waste dumps, and generally preparing for a regular start today. On Saturday instructions were given for the proper sinking of the shaft, m which your manager will take out ore enough (if possible before the roads blocked with snow) to send you a few silver bricks as a foretaste of what y be expected when things are in a more advanced stage of progress. A conct has also been let on favourable terms for the hewn timber wanted during winter, and we have borrowed from the I.X.L. Company a quantity of sawn ck timber, to be repaid when the roads are in a better condition. From the me company and the Franklin Company permission was obtained to use their uses for the accommodation of our men till the spring. These arrangements l save a very considerable item in the hauling (at the present season very exnsive), and the cost of the erection of buildings. In spring, however, houses ll have to be built at the mine for the men, and supplies of timber laid during fine weather. The limited scale or system of development referred to in the port would have been confined to one of these two things—either sinking on line near D, or the continuation of the present tunnel along the footwall of e ledge to the large outcrop at C; which of these plans were adopted would ve depended entirely on the means at your disposal, but I prophesied a good turn from either. First, because from D was taken out the ore which gave to ssrs. Johnson and Matthey results even better than it yielded here; second, cause at C there is a fine-looking chimney (about 75 ft. from the present face), d the lay of the ground leads me to expect that under this chimney there is convergence of mineral ledges, which convergence generally produces schutes good ore. The work of development, for which the initiative was taken fore the receipt of your letter, combines both these *modi operandi*, and your instructions contain nothing which will make it necessary to alter the programme. The quarter section (90 acres) of timber land, referred to in the rert, has been secured and surveyed. A deed has also been taken from the ners of 2000 feet of the north extension of the Buckeye lode, an acquisition ich you may safely regard as almost doubling the value of your property. u now own 4500 ft. on this ledge. With regard to the more extended scehme operations there are many things to be considered. Long tunnels are exnsive articles. The incline which is now being sunk is on the ledge; this ould be continued all the winter, so as to have a supply ready for reduction spring. Everything considered, the speediest, most effective, and if, as prected, ensuring earlier returns, the most economic way also, to work the mine, by sinking a perpendicular shaft outside, so as to cut the ledge at 100 or 200 ft. ep. Arrived at this point, you can drift both ways on your ledge, and raise *i.e.*, take out ore from above. To prove the Acacia, a few hundred feet of nnel should be run into the casing of the ledge, and cross-cut at intervals, eping the direction as much as possible of the line of a lower tunnel, in case en the mine has been proved it may be deemed advantageous to run an adit vel to meet the shaft, by which to drain and work the mine permanently. Noing can now be done with the more extensive scheme this winter, and it is not cessary. Notwithstanding the lateness of the season, and the state of the ads, no effort shall be wanting here to verify our anticipations as to the ver bars.

IMPERIAL SILVER QUARRIES.—Extract of a letter received from r. Lewis Chalmers:—"Bulliona, Jan. 3: We ran 14 feet of tunnel last week, d on Saturday night were in 1338 feet, with very encouraging indications.

VAL ANTIGORIA (Gold).—T. Roberts, Jan. 23: We are pushing on th all speed the work for the new hoisting gear.

PESTARENA (Gold).—Thomas Roberts, Jan. 25: We have a further provement in the 46 end, south from Aquavite engine-shaft; this end yields w 4 tons per fathom; we expect a further improvement in this end shortly. e lode in the 33 end south yields 8 tons of ore per fm., worth 12 dwts. per ton, d the end north, in the 23, yields 6 tons per fm., worth 12 dwts. of gold per n. The stopes throughout these mines are much the same as for some time st. We will give an estimate of their value in our next. The Peschiera him-shaft has been communicated to the 33. In about one month, or as soon we have cut through an arch of ground over the plat in the 33, we shall be le to hoist from the 46 by means of the machine; one part of our force is now dening and raising the old 46 fathom level north.—Val Toppa: Everything this mine is much the same as last week. The stopes at Nos. 2 and 3 are oking well.—Surface: For the season of the year we are making fair progress the stamps-wheel for Val Toppa establishment, in excavations and masonork for the wheel-pit, and in the shoots from the wire-rope tramway station the establishment. At Pestarena we are not so forward with our work, owing the great quantity of snow and ice. We are, however, when weather perits, working on the new water leat, to bring home a greater head of water to e Peschiera hoisting turbine. The pipes are on the road to the mine.

TELEGRAM.—The directors have received the following telegram: 413 ozs. of ld, obtained in January.

CAPULA (Silver).—Capt. Paull, Dec. 27: Torta No. 11 was washed st week and produced 397 marcs, also torta No. 2 (Jesus hacienda) of 83½ cargas, d produced 84 marcs 1 oz.; total from the two torta 481 marcs 1 oz. (3849 ozs.), hich we shall send to Mexico by the next conducta. We have sent to Jesus d San Diego hacienda this month 413 cargas of metal, which we shall comete this week to 450 cargas for No. 3 torta; the ley is not so high as the metal nt to San Cayetano; mine assay 15 marcs per monton.—Mine: The ground in n Pablo cross-cut is still very hard, and letting out but very little water; it composed of white quartz. We have met with water in San Enrique winze, hich has prevented us from sinking. I put the men last week to drive south rough the lode, where they have met with blue ore again of very good quality, ith pretty quartz; the gossan part remains entirely to the north; from the pearance of the lode on Friday last, I think it will improve very much before e reach the south wall; this has always been a very promising point, improving depth. The ground is again hard in the Esperanza, but the lode is more omising; there is a branch coming in from the south at a very acute angle, oducing blue ore with scarcely any bronce, we expect a good lode at the juncon. The stopes east of San Jorge rise are very much fallen off this last fortight, that is Nos. 3, 4, and 5; Nos. 1 and 2 are just the same, and so are the stopes the west. We are getting a great way above the Esperanza level, the metal s continued higher up than any of us expected; if we once get the bottom ry, we shall soon be able to make up for the deficiency in the back stopes. The ater is gradually sinking in Guadalupe winze, but San Miguel is still full.

NEW WILDBERG.—Capt. Sanders, Jan. 28: East Mine: During e week some good stones of ore have been found in the drivage east of the rbstollen, but not sufficient to value. There is a change in the ground, and e part of the lode being carried in the drivage has a promising appearance of proving shortly; an improvement in this place would be of great importance, being in new and unexplored ground.—Carter's Shaft: The drivage and stopes t the 70 lachter level, on Erbtiefstergang Erzkammer, remains as last week, elding on average 1¼ ton of ore per lachter. The rise and stope above the 60, wards Johannes' sink, are opening out wider, and yielding 1 ton of ore per bic lachter, and the stope east of Michael's shaft 1 ton per cubic lachter. The ope above the 50, on Dornergang Erzkammer, remains as for some time past, orth 1 ton of ore per lachter, and the pitch above the same level, on the ottesbülfe, 1¼ ton per lachter.—Beck's Workings: There is no change to notice this part of the mine during the week.—Blumengang: The stope above the lachter level is yielding 2 tons of ore per lachter, and the stope above the lachter level 1¼ ton per lachter.—West Blumengang: The hydraulic pumpg-engine was put to work on Wednesday morning, and is pumping out the ater very satisfactorily.

WEST CANADA.—Capt. Williams, Jan. 1: Huron Copper Bay: The ope on the east of Stephens's winze, below the 20, is worth over 2½ tons of ore er fathom. The lode in this stope is now 3 fms. wide, and yields a large quanity of stuff of a low percentage. The increase in the width of the lode is owing the junction of a north branch with the main lode at this point, and we hope will prove productive as we proceed. We are making preparations for startg a winze in the bottom of the 35 to the west of this stope, so as to open up the rge block of ground standing between this and the 50. This winze will be a ontinuation of Stephens's winze. The stope in the bottom of the 20, west of almer's shaft, yields about 2½ tons per fathom. The stope below the 20 athom level, east of this shaft, is finished. The stope below the 35 east of his shaft, is much poorer than we have seen it for a considerable time, and it ill now scarcely yield 2 tons of ore per fathom. The stope below the 20, west f Powell's winze, on the Fire lode, is worth 2¼ tons per fathom. We have gain resumed the driving of the level through the arch west of this stope, and he lode is looking very promising; it yields at the present time nearly 2 tons f ore per fathom. The lode over the 35, east of Bray's engine-shaft, still looks ell, and yields 2¼ tons of ore per fathom. The stope below the 35, east of this haft, and east of Bartle's winze, is not changed, and still yields 3 tons of ore er fathom. The lode in the 60, west of this shaft, still yields 1¼ ton of ore per athom. We are making very slow progress with this level, owing to the hardness of the ground. The 60 east yields from 1¼ to 2 tons of ore per fathom. The 50, west of Palmer's, is not changed, and still yields 1¼ ton of ore per fathom. Bartle's winze, below the 50, east of Bray's, is worth from 2½ to 3 tons per fathom.—Wellington Mine: The stope east of Rowe's shaft, yields 2¼ tons of ore per fathom; the stope will improve again when we get a little further east. The stope west of this shaft looks well, and yields 3 tons of ore per fathom. All our machinery is in good working order, and we are doing our best to get as much ore as possible by the opening of navigation.

[For remainder of Foreign Mines see to-day's Journal.]

MINING, METALS, AND MINERALS—PATENT MATTERS.

BY MICHAEL HENRY,
Patent Agent and Adviser, Memb. Soc. Arts, Assoc. Soc. Eng.

Mr. EDWARD G. BREWER, of Chancery-lane, has specified a patent relating to connecting pipes or tubes. This invention consists in connecting pipes or tubes in the following manner:—The pipes or tubes are formed with a bevilled ring at each end, or in some cases only at one end; a ring of india-rubber or other analogous material divides, as it were, the bevilled ends of the pipes, which are themselves received in a ring-clip, or clips, also of a wedge-like form, and held together by a nut and bolt, the latter also being wedge-shaped. Pipes with plain ends, or broken pipes, are jointed or united together, according to this invention, by the use of sockets, which may be cast or made in a piece, with bevilled rings; india-rubber or other rings by preference, too, are employed. The broken or other ends of the pipes are placed in the socket or sockets; then, by screwing up the wedge-like shaped nut the flexible ring is pressed round the outer surface of the pipe, and a perfectly sound joint is secured. This joint or socket is applicable to wood, asphalt, or any other sort of pipe, and can be applied with ease thereto. The single bevel joint can be supplied at a very reduced price to that of barrel-unions, now used for wrought-iron, copper, brass, lead, or any other sort of tubing, and may be used for connecting together parts of machinery. Sometimes the pipes are cast or formed on the bevel—that is, the ends are not right angles, so that when placed together a slight curve is formed, but by reversing the pipes they become straight.

Messrs. H. DOWNIE, Corstorphine, Mid-Lothian, and J. B. HARRIS, of Edinburgh, have specified a patent relating to shoes for horses. This invention relates to novel combinations of metal and india-rubber, or other flexible or elastic material, in the manufacture of horse-shoes. The metal portion of each shoe is made in one piece, or jointed preferably; the former and the india-rubber, or other flexible or elastic material (hereafter for brevity called rubber), is so fitted thereto or therewith that it projects on the treading surface beyond the metal, and so, when in use, deadens the concussion which ordinarily, and without it, the legs and frames of horses are subjected to when travelling on hard roads; but the rubber projects only to such an extent that when the weight of the horse comes to bear on it it will be flattened, and hence shoes having bearing surfaces composed of hard and elastic substances are provided. The importance of a treading surface of the above description, and the advantages derived therefrom, are generally acknowledged, and, indeed, are obvious.

Mr. THOMAS CLARKE, of Ladyfield, Chester, has obtained a patent for an invention relating to the construction and working of velocipedes for use on land or water, parts of which improvement are also applicable to wheeled vehicles of every description. The object of this invention is to produce a perfectly safe and comfortable velocipede, by the employment of which a much higher rate of speed can be attained, less exertion is required, and which is so constructed as to be capable of carrying and being worked by one or more persons. The invention consists, firstly—in the application of the philosophical principle of causing the weight of the person, or persons, to be carried to act as part of the moving power, and this he proposes to effect by placing the weight as far forward as possible in advance of the central line of specific gravity of the driving-wheels, at the same time endeavouring to secure a safe and steady balance in descending inclines, or passing over inequalities of the ground; secondly, in the application of a variable reduplicating or multiplying power by means of wheels (either toothed or plain), drums, or pulleys, and a combination of foot and hand power (or foot or hand power separately), and substituting one power for the other at will, according to the nature of the ground travelled over, by which means either a much higher rate of speed than hitherto can be obtained, as an increased tractive power, with a diminished speed, may be substituted when required; thirdly, in the adaptation of the same mechanism, slightly modified, to the propulsion of small boats or vessels on water, by means of a screw or paddles.

Mr. E. T. HUGHES, or Chancery-lane, has specified an invention for Saws or other similar instruments for cutting and dressing stone (communicated to him from abroad by I. E. Newton, of Waterburg, United States of America). The invention relates to improvements in saws or instruments for cutting or dressing stone in which the cutting points are formed of diamonds or other similar precious stones. The object of the invention is to secure the diamond or stone, so that it cannot move from its position when in use (a serious disadvantage in saws or other instruments as at present constructed), and the invention consists in enclosing the diamond or other stone between two blocks of metal, a recess being formed for its reception, so that the point of the diamond or other stone will project therefrom, and the said blocks are set into the saw or other instrument, so that they cannot be moved laterally therefrom, and the blocks are keyed therein, to prevent them from being drawn out longitudinally.

Mr. C. COCHRANE, of the Ellowes, Upper Gornal, Stafford, has obtained a patent for an invention relating to the preparation of Iron Ores for smelting. This invention has for its object the deodorising of iron ore before its treatment in the blast-furnace, and consists in passing over the same a current or currents of highly heated carbonic oxide gas; such carbonic oxide may be prepared from any source, but it is preferred to take it as it passes from the top of the blast-furnace, together with other gases, and to pass it through suitable heating stoves of known construction, whereby it is heated to the requisite degree before passing into a closed, or partially closed, chamber or kiln containing the iron ore to be operated upon. The action of the carbonic oxide upon the iron ore will also, to some extent, carbonise the iron, and thus the ore, after treatment as above described, will require little more than the action of heat and the addition of the requisite fluxing materials in the blast-furnace to convert it into the cast-iron of commerce.

CHEMICALS, MINERALS, AND METALS.—J. Berger Spence and Co.'s Report.—In some branches of the chemical trade the improvement named in previous reports has been maintained, although the business done during the week has not been large; the engagements of the manufacturers are sufficient, coupled with a moderate demand, to keep prices firm. For alkalies of most descriptions there has been an ordinary market. Bleaching powder being well contracted for, producers display little anxiety to undertake further obligations, unless at an appreciable rise on their present contracts. In minerals there has been a better market for the various descriptions for smelting operations; and for the chemical trade an average amount of orders have changed hands. Trade in metals remains inactive, and very few transactions are reported during the past week. Scotch pig-iron closes steady at our quotations. Manufactured iron is slow of sale, and the advance is now only obtained by a few first-class firms. Copper is in moderate demand. Tin is rather firmer. Lead in steady enquiry. Spelter quiet, and unaltered in price.—Soda: For ash, caustic soda, and crystals there is but an ordinary enquiry, and prices remain unaltered. In bicarbonate some unimportant sales have taken place at 9*l*.—Nitrate of Soda: Is still unsteady, prices at the moment being much the same as last week.—Potash: For muriate of 80 per cent. higher prices are offered, and 7*l*. 17*s*. 6*d*. to 8*l*. has been paid for immediate shipment, f.o.b.—Saltpetre: Some little demand, at 21*s*. 3*d*. to 23*s*. for foreign, and 26*s*. for English refined.—Alum meets with a quiet market, at 6*l*. 5*s*. for loose lump, and 7*l*. for export barrels, and same for ground. London prices, 10*s*. per ton higher.—Ammonia: Sulphate still finds buyers at high prices; white and grey are more wanted; brown, being considerably run upon, is well sold forward, at 15*l*. 10*s*. for 22 per cent.—Copperas: Green and rusty find readier purchasers, at 2*l*. 10*s*.; dry in steady demand, at old rates.—Pyrites: Consumers are well contracted forward, and prices remain unaltered. Calcined in somewhat less request, though 44*s*. R.C. is still obtained.—Lime: Phosphate of 65 per cent. is in more demand, at 52*s*. 6*d*.; bleaching powder still sells at 8*l*. for 35 per cent.; disinfectants, at 5*l*. 5*s*. for best quality, obtain a ready sale.—Manganese: For 70 per cent. 80*s*. per ton is taken.—Iron Ore: Hematite in fair request, and at unaltered value; oolitic much enquired for, and prices remain firm.—Guano: Peruvian, 13*l*. 7*s*. 6*d*. to 13*l*. 10*s*. for firsts.—Iron: Scotch pig-iron closes steady, at 55*s*. 6*d*. to 55*s*. 7½*d*.; Cleveland firm, at 49*s*. for Forge 4, to 52*s*. 6*d*. for No. 1; Welsh bars, 6*l*. 5*s*. to 6*l*. 7*s*. 6*d*.; Staffordshire bars, 7*l*. 10*s*. to 8*l*. 10*s*.; gas tubes, 60 to 67½ per cent. off list; boiler tubes, 40 to 42½ per cent.—Copper: Quiet. English tough ingot, 71*l*. to 73*l*.; Chili slab, 67*l*. to 68*l*.—Tin: Firmer. English ingot, 111*l*. to 112*l*.; Straits, 109*l*. 10*s*. to 111*l*.—Lead: Steady. P.G. best soft English Pig-lead, 19*l*.—Spelter: Unaltered. English, 19*l*. 10*s*. to 20*l*.; Silesian, special brands, 18*l*. 15*s*. to 19*l*.—Ellesmere Chambers, King-street, Manchester, Feb. 3.

ECONOMY OF FUEL IN BLAST-FURNACES.

At the Institution of Mechanical Engineers, in Birmingham, Mr. CHARLES COCHRANE, of Dudley, read a paper "On the Further Economy of Fuel in Blast-Furnaces, derivable from the High Temperature of Blast obtained with Cowper's Improved Regenerative Stoves at Ormesby, and from Increased Capacity of Furnace," &c. The improved regenerative hot-blast stoves at the Ormesby Iron Works, Middlesborough, are heated entirely by the waste gas taken off from the blast-furnaces; and the heat developed by the combustion of the gas is stored up in the stoves by means of the regenerator, consisting of a large mass of open-built fire-brick, through which the heated current is made to pass in a downward direction on its way to the chimney. The mass of fire-brick thus becomes heated up to a very high temperature at the top, the temperature gradually diminishing towards the bottom of the regenerator; and the blast being then caused to pass through the regenerator in the contrary direction, takes up the heat stored in the fire-brick, and becomes itself heated to the same high temperature previous to entering the blast-furnace. In the present stoves, which are of considerable larger dimensions than the original stoves on the regenerative plan at these works, the combustion chamber at the top of the stove has been increased in proportionate capacity, in order to ensure, as far as possible, the complete combustion of the gas in the stove before entering the regenerator. The area of all the passages has also been enlarged, and the fire-bricks in the regenerators are set wider apart, for the purpose of enabling the stoves to continue a longer time at work before the regenerators become so much choked by the dust conveyed in the gas from the blast-furnace as to require cleaning out. In order to remove this dust previously, as far as practicable, the waste gas to be consumed in the stoves is passed through a purifier, which is composed of a series of horizontal cast-iron trays, arranged in a number of tiers above one another, and exposing a large extent of horizontal surface for the dust to be deposited upon in the passage of the gas through the spaces between the trays. The bottoms of the trays are perforated with long narrow slots, the depositing surface in each tray being immediately under the orifices through which the gas and dust pass in the tray above.

In consequence of these improvements in the regenerative stoves, the blast heated by them is now maintained in regular working at the high temperature of more than 1400° Fahr.; and, although the annual expenses for cost and maintenance of the regenerative stoves are about the same as those of the most improved cast-iron stoves heating the blast to about 1000° Fahr., the economy of fuel in the blast-furnace, consequent upon the higher temperature of blast, is found, from the experience of actual working, to amount to as much as 4 cwts. of coke per ton of iron made. The amount of economy of fuel, however, that is due to equal increments of temperature in the blast has been found by the experience of the temperatures already reached in practice to diminish rapidly as the temperature is raised; and it is, therefore, considered by the writer that the further saving of coke in the blast-furnace for a still further increase in temperature of blast from 1400° to 1700° would be less than 1 cwt. per ton of iron. With regard to the capacity of blast-furnaces as affecting the economy of fuel by diminishing the temperature of the escaping gas, the actual result now obtained at the Ormesby Iron Works, with a furnace of 20,000 cubic feet capacity, is a consumption of 20 cwts. of coke per ton of iron, with the blast heated to upwards of 1400°, and with calcined ironstone yielding 40 per cent. of iron; and assuming that the same reduction of temperature which has been effected in the waste heat escaping from the regenerative stoves by doubling their capacity would also be effected in the waste gas escaping from the blast-furnace by doubling the capacity of the furnace, it would follow that by doubling the capacity of the present large furnaces of 20,000 cubic feet the further economy of fuel consequent upon reduction of heat in the escaping gas would be about 2 cwts. of coke per ton of iron made. In reference to the effect of increased heat of blast upon the temperature of the escaping gas at the furnace top, the working of two similar furnaces, of 20,000 cubic feet capacity each, has shown that neither extra heat of blast nor extra driving has any prejudicial effect on the temperature of the escaping gas; and that the extra heat thrown into the furnace by the hotter blast is met by the extra duty to be performed in compensating for the diminished proportion of coke consumed per ton of iron made.

THE TEMPERATURE OF COAL MINES.

A paper by Mr. EDWARD HULL, the well-known geologist, entitled "Observations on the Temperature of the Strata taken during the Sinking of Rose Bridge Colliery, Wigan," was read at the Royal Society last week. Mr. Hull stated that—In an elaborate paper by Mr. W. Hopkins, entitled "Experimental Researches on the Conductive Powers of various Substances," published in the Philosophical Transactions for 1857, an account is given of a series of experiments made under the general supervision of Mr. Hopkins, F.R.S., himself, and Mr. W. Fairbairn, F.R.S., during the sinking of the Astley Pit of Dukinfield Colliery, in Cheshire. At the time this paper was written the depth attained was only a little more than 1400 ft., and the rate of increase between the depths of 700 feet and 1330 feet was found to be 1° Fahr. for about 65 feet. These observations were subsequently continued until the pits had attained their full depth of 717 yards from the surface, The last observation made was in the shale overlying the coal seam, known as the Black Mine, which it was the object of the proprietor, Mr. Astley, to reach, and the temperature was found to be 75° Fahr. Assuming the "stratum of constant temperature," or, as it is also called by Humboldt, "the invariable stratum," to be that which was reached at 16·5 ft. with a temperature of 51° Fahr., the total increase of temperature would amount to 24° Fahr., giving as the rate of increase 1° Fahr. for every 88,925 ft. This is much below the average rate of increase. During a part of the period above referred to (from 1854-6), another coal pit was being sunk at Wigan, which reached the depth of 600 yards, down to the celebrated Cannel Mine. At this pit similar observations on the temperature of the strata were made very carefully by the manager, Mr. Bryham, which were kindly communicated to myself for publication, and will be found in my work on the "Coal Field of Great Britain." The ultimate temperature attained in this pit at the depth from the surface of 600 yards was found to be 72° Fahr.; and assuming the invariable stratum to be the same as that at Dukinfield Colliery, the resulting rate of increase would be 1° Fahr. for every 61·5 ft. which accords very closely with the result obtained by Prof. Phillips, F.R.S. at the Monkwearmouth Colliery.

Since the time above referred to, the proprietor of the Rose Bridge Colliery, Mr. J. Grant Morris, determined to carry down the shafts from the Cannel seam to the Arley seam of coal, which was known to lie more than 200 yards below it; and consequently in the spring of 1868 preparations were commenced for carrying out this project. In the incredibly short time of one year and two months the Arley coal was struck, and was found to be of good thickness and quality. The total depth reached was 808 yards, and the ultimate temperature in the coal itself was found to be 93½° Fahr. The manager of the colliery, Mr. Bryham, sensible of the value of observations on the temperature of the strata at such unusual depths (this being probably the deepest colliery in the world, certainly in Britain), made a series of observations with as much care as the circumstances would admit, and has entrusted them to me for publication. The mode of taking the observations was as follows:—On a favourable stratum, such as shale, or even coal, having been reached, a hole was drilled with water in the solid strata to a depth of 1 yard from the bottom of the pit. A thermometer was then inserted for the space of 30 minutes, the hole having been sealed and made air-tight with clay. At the expiration of the half hour the thermometer was taken up and the reading noted. It might possibly be objected that the time allowed (30 minutes) was sufficient for the embedding of the thermometer, and that the readings are liable to error from this cause. I feel sure, however, that if any error has arisen it is inappreciable, and does not in the least invalidate the general result. In fact, I am assured by Mr. Bryham that, from actual testing on several occasions, he found less than this time of 30 minutes sufficient for the purpose required.

While the temperatures of the strata were being measured, observa-

tions were also carried on *pari passu* on those of the open pit during the descent. These are given in the table annexed. By a comparison of the results in the two columns, it will be observed that as the depth increased the differences between the corresponding temperatures in the pit and the strata tended to augment; in other words, the temperature of the strata was found to augment more rapidly than that of the open pit. The effects of the high temperature and pressure on the strata at the depth of 2425 feet are, as I am informed by Mr. Bryham, making themselves felt, and cause an increase in the expense both of labour and timber for props. This colliery, in fact, will be in a position to put to the test our views and speculations on the effects of high temperature and pressure on mining operations. In order to obtain the average rate of increase of heat as shown by the experiments at Rose Bridge Colliery, we may assume, in the absence of direct observation, the position and temperature of the invariable stratum to be 50 feet from the surface and 50° Fahr. which is probably nearly the mean temperature of the place. With these data, the increase is 1° Fahr. for every 54·57 feet, which approximates to that obtained by Prof. Phillips, at Monkwearmouth, of 1° Fahr. for about every 60 feet. If on the other hand, for the purpose of comparison, we adopt the measurements for the invariable stratum as obtained at Dukinfield, we find the rate of increase to be 1° Fahr. for every 47·2 feet as against 1° Fahr. for every 83·2 feet in the case of Dukinfield itself.

So great a discordance in the results is remarkable, and is not, in my opinion, attributable to inaccuracy of observation in making the experiments. On the other hand, I may venture to suggest that it is due, at least in some measure, to dissimilarity in the position and inclination of the strata in each case. These I now proceed to point out. Rose Bridge Colliery occupies a position in the centre of a gently sloping trough, where the beds are nearly horizontal; they are terminated both on the west and east by large parallel faults which throw up the strata on either side. The colliery is placed in what is known as "the deep belt." Dukinfield Colliery, on the other hand, is planted upon strata which are highly inclined. The beds of sandstone, shale, and coal rise and crop out to the eastward at angles varying from 30° to 35°. Now, I think we may assume that strata consisting of sandstone, shales, clays, and coal alternating with each other, are capable of conducting heat more rapidly along the planes of bedding than across them, different kinds of rock having, as Mr. Hopkins's experiments show, different conducting powers. If this be so, we have an evident reason for the dissimilar results in the two cases before us. Assuming a constant supply of heat from the interior of the earth, it could only escape, in the case of Rose Bridge, across the planes of bedding, meeting in its progress upwards the resistance offered by strata of, in each case, varying conducting powers. On the other hand, in the case of Dukinfield, the internal heat could travel along the steeply inclined strata themselves, and ultimately escape along the outcrop of the beds. I merely offer this as a suggestion explanatory of the results before us, and may be allowed to add that the strata at Monkwearmouth Colliery, the thermometrical observations at which correspond so closely with those obtained at Rose Bridge, are also in a position not much removed from the horizontal, which is some evidence in corroboration of the views here offered.

THERMOMETRICAL OBSERVATIONS AT ROSE BRIDGE COLLIERY.

Date.	Depth in yards.	Strata.	Temperature in open pit.	Temperature in solid strata.
July, 1854	161	Blue shale	— ° F.	64·5 ° F.
August, 1854	188	Warrant earth	—	66
May, 1858	550	Blue shale	—	78
July, 1858	600	Warrant earth	—	80
May 18, 1868	630	Raven coal	73	83
July 24, 1868	665	Linn and wool	75	85
April 19, 1869	673	Yard coal mine	76	86
Nov. 18, 1868	700	Strong blue metal	76	87
Feb. 22, 1869	736	Strong blue metal	76	88½
March 12, 1869	748	Shale	77	89
April 17, 1869	762	Linn & wool, or shale	78	90·5
May 3, 1869	774	Strong shale	80	91·5
May 19, 1869	782	Blue metal	79	92
July 8, 1869	831	Strong blue shale	79	93
July 16, 1869	808	Coal (Arley mine)	79	93½

The Royal School of Mines, Jermyn Street.

MR. WARINGTON SMYTH'S LECTURES.

[FROM NOTES BY OUR OWN REPORTER.]

LECTURE XXII.—The last lecture (said Mr. SMYTH) placed before you the chief considerations which influence the various systems on which the men are to be paid for divers kinds of work; and you will have seen that widely different methods are compatible with each other, even in one mine. Any attempt to pay by one method in metalliferous mines especially would be detrimental to success; and it is, therefore, a necessity which cannot be got over to pay in a mixed way, both as to the ground laid open for exploration and that also which has to be brought away. It is sometimes necessary to combine two systems even in the same bargain, and to give a certain amount to the men according to the extent they drive, and allow them besides so much for every ton of ore they extract, the object of the latter being to render them careful not to allow the valuable material to mix and be lost amongst the attle or waste. We will now pass on to consider a little more in detail the workings themselves, taking first those being carried on for non-metallic minerals open to the day, and, therefore, called open workings, or quarries. Amongst these some of the simplest, at first sight, are where certain quantities of loose material have to be removed, but where, nevertheless, great care must be taken as to the system upon which it is to be done. A very small mistake in that system, when the quantities are large, may make a great difference in the economic results at the last. The overlie in such cases generally consists of vegetable soil, or sand, or gravel, and it may include a quantity of useless rock, before the material to be turned to account can be reached. Some very notable examples of successful arrangement of this kind are to be found in the stream works of Cornwall, and which have been imitated on a much larger scale, at least in principle, in similar works in Australia and California. Dealing with the removal of the "overburden," as it is called, the useless sand and gravel which overlie the ore-bearing sand, which is next to the rock, often involves the removal of 30 or 40 feet of this material. At Pentuan, near St. Austell, there is a stream work between two hills; the alluvium to be removed is nowhere less than 20 feet, and often reaches as much as 40 feet. In working a place of this kind it is usual to begin at the lowest end, and gradually proceed upwards. Having thus opened the ground, and worked up to a certain distance, the over beds are cut through by a series of steps. In this country it is important that the surface soil should not be destroyed, and, consequently, the turf is always carefully rolled up and stacked, and the vegetable soil also is placed aside in convenient heaps, so that when the work is done the soil may be respread, the turf relaid, and no occasion is given to the farmer or landlord to complain.

There is usually a natural stream running through valleys of this kind, and its course is so managed that the loose debris is easily washed away by the action of the water, leaving the portion in which tin or gold is expected to be found for closer inspection. This is a kind of work which has lately been going on in the north-east part of Scotland, at Helmsdale, or what is called the Sutherland gold diggings, where some of the operations are on a large scale, the steps being 7 or 8 feet in height. The overburden being almost invariably composed of incoherent material, it would be a bad arrangement, and nearly impracticable, to cut it in a straight line, like a quarry; and, besides, by cutting it away in steps many more men can be placed at work on a given amount of material, and that, too, with perfect safety. As the material is removed it is thrown back in heaps, and afterwards fills up again a great portion of the space opened. Then the valuable detritus being left uncovered is subjected to the various processes in vogue for obtaining the metallic particles which constitute its wealth. In cases of this kind much difficulty is sometimes experienced in getting rid of the water. Of course, there are numerous localities where this does not occur, but in California "wet diggings," as they are called, are by no means unfrequent. One of the commonest modes of dealing with it is to construct a culvert, which follows up the works, and into which the water is directed, the rubbish being piled over it. The construction is often rude and unfinished, the roof being merely stones laid across, and the rubbish piled upon it. Of course, an outlet must be secured, and that being done all the surplus water passes away by a continual and uninterrupted drainage, and by this system the works advance through the valley, the soil being replaced and the surface made good as they proceed. If the land be marshy it is returned to the agriculturist in a very much better condition than when the miners took it in hand. Sometimes it is necessary to turn a stream by a dam, and carry it past the works in artificial channels. Roads may have to be diverted in the same way, and in thickly populated countries a great deal of money may have to be laid out in this way, which in California and Australia will involve next to nothing in expenditure.

The cost of removing the overburden, if done by manual labour entirely, is very heavy, and particularly in new countries, like California, where labour is dear. The Californians, to meet this difficulty, have introduced a system which they call "hydraulic mining." Water is brought from reservoirs, or tanks, by what are called "flumes," or aqueducts, which are placed at an elevation of 130 or 140 feet above the auriferous gravel to be acted upon; and there will be a mass of from 120 to 160 feet of gravel to be removed. The water, thus conveyed, passes into a large wooden tank, or "box" as the local term is. This box is provided with a valve, and from it the water is conveyed to the bottom of the working by means of a strong sheet-iron rivetted pipe, from 8 to 14 in. in diameter, in the sides of which are apertures, provided with slide valves and union joints, to which four or five flexible tubes or hose are attached, each ending in a nozzle of bronze 2½ to 3 inches diameter. From these powerful jets are directed against the face of the working, with a force which, it is said, can only be compared to that of ordnance, and where the supply of water is large, and the fall considerable, the effect is perfectly astonishing. The quantity of material dislodged by a single arrangement of this kind is greater than could be produced by a regiment of navvies, and its economy, therefore, is extremely great. Mr. J. A. Phillips, in his recent excellent work, entitled "Mining and Metallurgy of Gold and Silver," gives as an illustration of the amount of work which can be performed in a given time by hydraulic mining the results obtained at the Eureka Claim, near San Juan, California, where the bed of "pay-dirt" is about 135 feet in depth. The upper portion of this deposit, to the depth of 70 feet, does not contain a large amount of gold, but is easily worked, whilst the lower portion, having a thickness of 65 feet, is much richer, but cemented together, and the work is, therefore, carried on under conditions of considerable difficulty. The pay-dirt is reached by a bed-rock tunnel of great length, which cost on an average $8 per foot, and of which the total expense was $28,000. The work is carried on by means of four *jets d'eau*, discharging together about 208 gallons per second, or 12,500 gallons per minute, under a pressure of 140 feet. The whole of the operations are conducted by four men, and at the expiration of ten working days the washing down of fresh earth is suspended, and the sluices cleared up. In these ten days 36,500 cubic yards of gravel are worked over. All that the men have to do is to direct the nozzles, and no human labour can be placed in comparison with the system, either in effect or economy. Mr. Phillips gives an interesting statement of the cost of these ten days, as follows:—Cost of water, $1000; labour, $173; sundries, $100—total, $1273. The average quantity of gold obtained in this period is worth $6000. This is sufficient to give an idea of this admirable method of removing the overburden when it is composed of loose material; but when it is more adhesive charges of powder must be used. Examples are still to be found in this country of hydraulic mining on a small scale, and particularly in the hilly portions of South Derbyshire, where it is called "patching," and of Wales. When, however, the beds dip into the hills, patching will no longer pay, and recourse must be had to underground workings. Very similar is the case of the slate quarries of North Wales, in which a vast amount of capital is embarked, and thousands of workpeople are employed.

Remarkable examples of the working away of rocks on a large scale are furnished by the quarries of the Cambrian and Silurian deposits at Bangor, Llanberis, Llanllyfri, and Carnarvon. There are also some admirable workings at Festiniog and to the south of Dolgelly; and, indeed, these two classes of rocks are distinguished, not so much for the excellence and colour of their slate as for their cleavage. In the Bangor and Carnarvon districts the cleavage is nearly vertical, while at Festiniog it has a considerable angle, and hence the workings assume different forms. The most remarkable quarries are those of Lord Penrhyn, not far from Bangor, which are wrought in a most systematic manner, and it has taken many years to bring them into their present form.

Those who may have to open new quarries should be careful so to place them as to secure future regularity of form, and great care should be taken to provide a sufficient amount of room in a convenient place for the rubbish, as for every ton of saleable slate there are, on the average, 20 tons of refuse to be got rid of. For this reason open workings in narrow valleys should always be regarded with suspicion, as after a time they will always have to pay extravagantly for tip-room, and capital will thus be spent upon what ought not to be charged to it. One scarcely likes to particularise, but cases in which foolish expenditure of this kind have been incurred are by no means unfrequent. Indeed, there is no kind of mining adventure in which there has been more disappointment than in slate quarries. Of those worked on a large scale one-tenth, probably, would be a large proportion to say were profitable at an early period of their history. Tempting statements are put forward as to the character of the slate to be worked, which may be true enough, but if it can only be approached from a narrow valley, or under circumstances which do not allow of the easy and inexpensive removal of the rubbish, matters seldom mentioned or taken into account, the speculation will prove a losing one. The usual mode of working is by a series of steps, each step having a railroad, or tramway, upon it, for the easy removal of the material. The quarries at Penrhyn are in the shape of a vast amphitheatre, nearly half a mile across, giving ample space for the rubbish to be tipped. The good slate is carried down a self-acting incline, the full wagons as they descend drawing up the empty ones. It must never be forgotten that a second removal of the rubbish is not only fraught with enormous expense, but is often productive, besides, of much inconvenience. The first consideration, therefore, in laying out a slate quarry should be sufficient room, and that in the right place, and the proper sort of place for conveniently tipping the wagons. One of the most successful quarries now in Wales is one in which for the first 25 years of its existence no profits were divided: the overlie to be removed was great, and just as they were about to make profits a vast mass, estimated variously at from 60,000 to 100,000 tons, came down and filled all the workings. It is to prevent accidents of this kind that the step system is adopted, but they are, notwithstanding, tolerably frequent, and it is, indeed, wonderful that there is so little loss of life. Quarrymen are a hardy race, and have an ever watchful eye on anything overhead that is at all dangerous or threatening, and particularly where the strata are jointy, and, therefore, liable to break away suddenly. A very curious mode of breaking ground was made in North Wales last year. A vast mass had been pronounced unsafe, and it overhung a depth in which the Monument of London might be planted, and not been seen outside. They brought up a corps of volunteer artillery, which opened fire upon the rock, but the shots produced but little effect. I happened once to witness a fall of this kind, in which thousands of tons came thundering down in one mass, like an avalanche in the Alps. The only safeguard against catastrophes of this kind is to leave strong buttresses. The step system is, however, far preferable to those vast perpendicular cuttings, which in cases where the cleavage is parallel to the cutting are very dangerous. In opening slate quarries the direction of the cleavage is also a matter of importance, as sometimes its line is different to that of the bedding.

Some curious points have arisen now and again as to how far a quarry may come under the designation of a mine. It often happens in large quarries that drifts are run, perhaps, for drainage, and other underground operations are carried out. Indeed, in some places where access to a deposit of good slate is obtained on a hill side, the overlie being an unusually great thickness of useless material, it is found cheaper to work it as a mine rather than as an open quarry. Many lawsuits have arisen on this very point, but the conclusion arrived at appears to be that workings in the daylight are quarries, while those in which artificial light must be employed are mines.

Another material of importance chiefly obtained by quarrying is building stones, of which there is a considerable variety, but they are sometimes obtained by mining; as, for instance, the Box Quarries, which have already been mentioned, and where the works are carried on with great regularity and success.

LECTURE XXIII.—I have already mentioned that when open workings, carried on by the light of day, advance into the condition of what may be called a mine artificial light becomes necessary. This happens as soon as the material forming the upper lie becomes of such a thickness that to remove it would be incompatible with economy, and thus sometimes these workings in one part are carried on as quarries, and in other parts underground. The latter is, however, a very expensive process, because although the open spaces are necessarily such as that the roof will sustain itself, there will be many places where the rock will have to be cut away in much narrower spaces than is usual in quarrying, and so absorb a considerable portion of the material which otherwise would be taken away, besides the cost of arrangements for ventilation, for where large quantities of blasting powder are employed dense bodies of smoke are produced, which must be removed before work can be resumed. If we take the case of a salt mine, or of brown coal or lignite, they will be found to resemble a slate working in so far as the whole of the material has to be removed as in a quarry. At the workings for brown coal at Bovey Tracey, in Devon, great slabs are taken away 20 ft. or 30 ft. in height, and they are essentially a sort of quarry. When the ground cannot be taken in long stopes the plan adopted is that of sinking holes, something like the gold diggings of California and Australia, and then removing the under material. The size of the pits being limited, the water may be drawn out by buckets or hand pumps, and in this way they work down to the bottom of the deposits. The sides of the pit at the bottom are then scooped away as far as is consistent with safety, but this is a wasteful mode of working. In the salt mines the same sort of thing may be observed. In Cordova, in Spain, there are magnificent open quarries, where the salt crops up to the surface of the ground, the solid rock salt standing out in bold cliffs, while in other places the workings are carried underground. This brings us to the subject of lighting these underground chambers, and what are the most suitable methods for lighting the various passages or galleries, shafts, levels, and the workings of mines. I need not speak of the exceptionable methods of foreign countries, as, for instance, the extensive cavernous workings of Norway and Sweden, where torches of resinous woods are employed, or such curious devices as that of imprisoning fire-flies in bottles, and endeavouring to work by the faint phosphorescent light thus obtained, but pass at once to those methods now generally used in ordinary mining districts. These consist almost entirely of candles and of various forms of lamps, and a controversy meets us upon the threshold as to which of these two are best. Candles have the advantage of being formed with greater facility and of being handier than lamps; but, on the other hand, they require constant attention, and are more apt to go out in strong currents of air, and also where the air is vitiated. They are best for the purposes of inspection, as they will throw a larger blaze of light on any particular spot, but they must be protected from draughts. The waste is immense where large numbers of men are using them to work by. It may be said that as the men pay for their candles or for their lamps, it is a matter of indifference to the employers, but that is a mistake, as in the long run any waste is sure to come back to the company or mine owners. In the salt mines of Hungary large candles, six to the pound, are used, but much smaller kinds are common in the metalliferous mines of this country, and in the collieries where open lights are objectionable. Thus in the greater proportion of the mines of Cornwall they have candles of 20 or 30 to the pound, but for some particular purposes, and for the agents and managers of the mine, larger sizes are made, which are called "captain's candles." Formerly a very thin long candle was used to test the presence of gas and condition of the atmosphere, and the coolness and judgment of the firemen in performing this dangerous duty was really wonderful. Where carburetted hydrogen is mingled with a certain volume of air, the flame of a candle burning in it is elongated more or less according to the proportions of the mixture. To apply this test, candles of 50 or 60 to the pound were held in the hand of the fireman, who advances when the presence of gas is suspected. He then gradually raises the light with a steady hand, and observes the elongation, shape, and colour of the flame. If the mixture is not safe the flame lengthens to such an extent that it appears as if it would suddenly break away, and leap off the wick. The experimentor then knows that they are on the very verge of an explosion. In former days, when the gas was tested in this way, the men acquired so much skill, and their confidence and coolness were so great, that they sometimes, merely in bravado, and to show what they could do, would advance the candle in the way I have described to the very verge of explosion, and then quickly withdraw it. In the present day the safety-lamp is employed to test the presence of gas, and is not only so much safer but so much better, that the former practice has fallen into disuse. When candles have to be carried into the mine it is necessary to have some sort of holder. A very simple and useful arrangement is to hold the candle with nippers, fixed on a pointed handle, which can be inserted in a cleft of the face of working quite near to the place operated upon. In the Mexican mines the candles are protected by a sort of box, with a reflector at the back and sides of wood, strongly made, and contrived to hang with a cord round his neck, and so leave both his hands at liberty. Another kind of Saxon blende is fitted with a slide of glass so as to retain the light while excluding the draught. In our own country it is usual to take a little well-tempered clay of sufficient moistness, in which the candle is inserted; and large lumps of clay are deposited at well-known spots in the mine for the use of the men, who knead it into the required shape with much handiness. The clay is then fixed by its own adhesiveness to the side of the rock or timber just where the work is being done, and the miner gets the light precisely on the spot where it is needed to direct his blows. As regards the quantity of candles thus used, it is customary to allow the men so many to take out from the mine stores a certain number for a week or a month, for which he is duly charged on the day of settlement. The usual allowance is about 2 lbs. of candles per man for a week of six shifts, of eight hours each. Of the various forms of open lights oil lamps have been proved to be more economical than candles. I do not know what adulteration tallow is susceptible of, but in all countries there are good and bad candles, and the latter are never satisfactory, either for lasting or lighting qualities. A well-made candle, with a fair allowance of wick, gives a large amount of flame, and has the advantage of being easily blown in again if puffed out by a sudden gush. When mines have a high temperature candles soften, and burn very rapidly, and then lamps are brought into play. It is a matter of dispute, but not one of much moment, whether in lamps it is better to burn tallow than oil. North of the Tweed, where the people are proverbially saving, they have a lamp of very simple construction, which costs only from 2½d. to 3d. each, and which will burn through an ordinary shift of eight hours at an expense of something between 1d. and 2d. Lamps, however, cannot be attached like a candle by the adhesion of a piece of clay, and must, therefore, have hooks or contrivances to hang them from the sides. At the Mons mines the lamps are mounted, as it were, on a longish pointed piece of iron, which is thrust horizontally into the wall or face of the workings, or in some closely adjacent position. Another form, used a good deal in the Hungarian mines, is a strong boat-shaped lamp made of iron, in which is burnt either oil or tallow; and many lamps have reflectors of white metal, which then produce a splendid light. In Hungary and the Hartz, in the mines of Prussia, of Westphalia, and of Spain, oil is universally used.

We will now turn to what is of far more importance—the lamps which have to be used in the presence of explosive gases, where open lights cannot or ought not to be tolerated. In some workings it is necessary from the first to employ safety-lamps, while in others the same necessity exists only as to certain parts. Everyone is acquainted with the introduction of the safety-lamp. At the end of the last century great anxiety was felt for the discovery of some system of obtaining a light even in the midst of the explosive mixtures of gases and atmospheric air, which infested the deeper collieries with so much danger, and many other modes were tried before the safety-lamp.

Amongst other things a succession of bright reflectors was tried, with the view of throwing the light transmitted by the shaft from its bottom into the levels, but this could not possibly answer for more than a short distance, and was of no avail for general use. It not unfrequently happened that drifts or cross-cuts would have to be made from one level to another for the purpose of ventilation, where it was impossible to go with naked lights, and men who would work in the dark were at a premium. In this way, by hook or by crook, cuttings were made, and then, a current of air being established, the work could go on for a time in the usual way, until the same difficulty would arise, and men would have to work in the dark again, which was a slow and laborious process.

Amongst other devices that of the steel mill was tried in the more dangerous parts. By this contrivance continuous showers of sparks were thrown off, affording a very dim, glimmering light. This contrivance lasted a long while, and it is not so many years ago since a pamphlet was written, calling it "the miners best friend." It has now entirely passed away, and the specimen which you will find upstairs in the Museum is regarded as a great curiosity. It was worked by some one, who had to stand beside the miner at work. It was believed that the sparks were not sufficient to ignite fire-damp, but two or three accidents occurring where the steel mill was used, suspicion fell upon it, and it was gradually discarded. About 1814, several serious accidents having taken place, the attention of Sir H. Davy was called to the matter, and about the same time Dr. Clanny and George Stephenson also studied the subject. Each of these three eminent men devised a lamp, severally known by their names. They are the three principal lamps in use to this day in England, modified, it may be, more or less in their application. Sir Humphry Davy principally relied upon the introduction of wire gauze, which, when the meshes do not exceed a certain size, intercepts the flame.

If we were to go into all the inventions and experiments connected with safety-lamps, six or eight lectures would be required for that purpose alone. We will, therefore, look only at those which have stood their ground, and are most used. A large collection will be found upstairs, and many of them have particular excellencies. The whole subject of safety-lamps, however, is undergoing a certain amount of critical examination. It is alleged that the element of safety is lost in a current of air moving beyond a certain velocity. A series of most interesting experiments are being made under the direction of the Northern Institute of Miners, some reports of which have been published, and it may be hoped that at last there is a prospect of a satisfactory lamp being devised. The gauze theory is that it prevents the flame in the interior of the lamp from being communicated with the gas without. The explosive gas will get into the lamp, and in that way its nature and degree of explosiveness can be tested. Little explosions may take place within the lamp, but they, too, will not pass through the gauze. The only danger is that the interior being filled with flame it is sometimes sufficient to make the gauze red hot, and particularly if it has not been kept clean, and is clogged with coal dust and drops of oil. When a place is to be tested the lamp must be advanced into it with slow caution. The motto of the fireman should, therefore, be *festina lente*. Sir Humphry Davy himself pointed out that if the lamp be carried in a quiet way, and kept upright, its efficiency is great, but if it be exposed to a current of air moving at the rate of (say) 3 or 4 ft. in a second the flame might be blown through the gauze. The lamp should only have a moderate height, such as 6 or 7 in., and 1⅛ to 1⅝ inch in diameter, as when made of a larger calibre it is no longer safe. Thus the size of the mesh is important, the proper size giving 784 apertures to the square inch. Many lamps, however, are made with 576 holes to the square inch, which greatly reduces the amounts of safety, and accidents have been traced to these unsatisfactory lamps. No "safety-lamp," so called, therefore, can be considered really safe unless all proper precautions are taken. The great defect of the "Davy" lamps is that the quantity of light they emit is very small, and thus the workmen are continually tempted to open them in order to obtain more light, and many dreadful accidents have occurred from this very circumstance. The inventions of Clanny and Stephenson are based on the same principle, and although not considered quite so safe have the advantage of giving a better light. Clanny's lamp has a wire gauze similar to Davy's, but it is protected by a cylinder of thick well annealed glass. Stephenson's lamp is not unlike Clanny's, the great advantage of both being that they are larger than the Davy, and, therefore, yield a brighter light. The introduction of the glass cylinder is held to counterbalance the increased danger arising from the increase of size. Stephenson's lamp is a great favourite with the miners, who call it the "Geordie," after the name of the inventor. More recently Mr. Biram, the agent of Lord Fitzwilliam, in Yorkshire, applied parabolic reflectors to the "Geordie," thereby very much increasing its illuminating power. Biram's lamp is not, however, a favourite, as it is too slight in appearance to give the idea of safety.

In Belgium the authorities have fixed upon four lamps for use in the collieries in that kingdom, and it is illegal to use any other. One of these, and that most used, is the invention of M. Museeler. When in that country, in 1862, I was informed that between 2000 and 3000 of them were then in daily use, and that no accident whatever had been traced to them. The lamp gives a good quantity of light, and the miners have, therefore, no excuse for tampering with the gauze. Another of the Belgian lamps is that of M. Dubrullier, which is so contrived that any tampering with the gauze, or any attempt to open it, puts out the light. A third Belgian lamp is that of M. Eloin, the light of which is produced by something like an argand burner. It is a safe lamp, but not much employed, because it does not give sufficient light.

The whole of the lamps I have mentioned, and various others, have been tried in the recent experiments, and the results, when all the tests have been completed, will be looked forward to with great anxiety. What is wanted is a contrivance which will combine security with a sufficient amount of light, so as to prevent the colliers from being tempted to open the lamp. It is a rule that all lamps should be locked before they are taken into any dangerous parts of the mine, but anyone who has examined will have seen that these locks are of such a simple construction that they may be readily picked with a bit of wire or a nail. Much ingenuity, however, has of late years been expended upon contrivances in which any attempt to remove the top or to get at the light will put out the flame. All these devices, however, and safety-lamps (even if they were perfect), will never prevent explosions if the men are allowed to carry matches in their pockets, and to smoke tobacco in collieries. There is a stupid, perhaps I might say a vicious, class who for the sake of a pipe would light a match in the most dangerous conditions of the atmosphere, risking not only their own lives, but those of their fellow-workmen. In many pits there are special rules against this practice, but unfortunately the discipline kept up is frequently so lax that regulations of this kind are disregarded with impunity. In some recent accidents lucifer matches were found in the pockets of the miners killed by the explosion of fire-damp.

GEOLOGICAL SOCIETY OF LONDON.—Jan. 26: Prof. Huxley, LL.D., F.R.S. (President), in the chair. Thomas Daniel Bott, Osberne-villas, Talfourd-road, Peckham; Edwin Buckland Kemp-Welch, Beaumont-terrace, Bournemouth; James Parkinson, F.C.S., Sarum House, Church-road, Upper Norwood; Henry Sewell, Villa del Valle, Mexico; and Thos. F. W. Walker, M.A., F.R.G.S., Athenæum Club, London, and Brock-street, Bath, were elected *Fellows* of the society. The Rev. Dr. Oswald Heer, of Zurich, was elected a *Foreign Member* of the society.

The following communication was read:—"On the Crag of Norfolk and Associated Beds," by Joseph Prestwich, F.R.S., F.G.S.

On Wednesday the following communications will be read:—1. "On the Fossil Corals of the South-Australian Tertiaries," by Prof. P. Martin Duncan, F.R.S., sec. G. S.—2. "Note on a very large undescribed Wealden Vertebra," by J. W. Hulke, F.R.S., F.G.S.—3. "Additional observations on the Neocomian Strata of Yorkshire and Lincolnshire, with notes on their relations to the Beds of the same age throughout Northern Europe," by J. W. Judd, F.G.S.

AUSTRALIAN HANDBOOK AND ALMANAC.—For those having business with Australia or New Zealand the calender just issued under this title by Messrs. GORDON and GOTCH, of Holborn-hill, London, Melbourne, and Sydney, will be particularly interesting. The publishers' long connection with Australia enables them to judge precisely the kind of information required, and to bring that information together in a convenient form. The calender contains a gazetteer of the principal towns in Australia, list of colonial securities, leading importers in Australia, London shippers to Australia, Customs duties of the United Kingdom, tariffs of Australia and New Zealand, postal information, and the usual almanac matter. It is a really cheap and useful shilling's worth.

LONDON GENERAL OMNIBUS COMPANY.—The traffic receipts for the week ending Jan. 30 was 8782*l.* 8*s.* 11*d.*

London: Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors), at their offices, 26, FLEET STREET, E.C., where all communications are requested to be addressed.—*Feb. 5*, 1870.